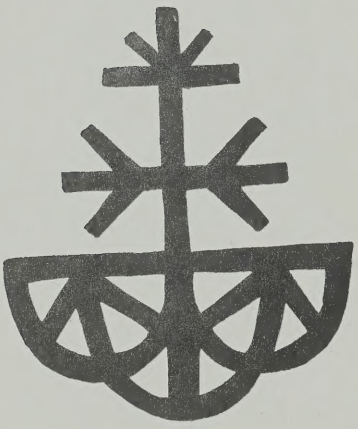

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1 2 Royal Commission
3 Royal Commission on milk

PROVINCE OF BRITISH COLUMBIA

REPORT

OF THE

MILK INQUIRY COMMISSION, 1928

Presented to the Legislature January 22nd
1929

PRICE 50 CENTS

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
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COURT-HOUSE, VANCOUVER, B.C.

The Honourable Mr. Atkinson,
Minister of Agriculture, Victoria, B.C.

DEAR SIR,—I have the honour to submit to you the Report of the Milk Inquiry Commission, together with such recommendations as we consider advisable and necessary in the interest of the milk and cream industry and the public as a whole. The recommendations as submitted are the unanimous decision of myself and colleagues.

Respectfully submitted.

F. M. CLEMENT, *Chairman.*

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(Sgd.) R. RANDOLPH BRUCE,
Lieutenant-Governor.

CANADA:

PROVINCE OF BRITISH COLUMBIA.

GEORGE THE FIFTH, by the Grace of God, of Great Britain, Ireland, and the British Dominions beyond the Seas, KING, Defender of the Faith, Emperor of India.

In the Matter of the "Public Inquiries Act."

COMMISSION.

To FREDERICK MOORE CLEMENT, B.S.A., M.A., Dean of the Faculty of Agriculture, University of British Columbia (Chairman); HIBBERT WINSLOW HILL, Medical Doctor, Director of Laboratories, University of British Columbia; and GEORGE ERNEST HANCOX, Barrister-at-Law, Vancouver; and to all whom the same may in anywise concern—GREETING.

WM. H. CARTER, *Deputy Attorney-General.*

WHEREAS at the last session of the Legislature of the Province of British Columbia a Bill intituled "An Act for the Relief of Dairy-farmers" was presented to and considered by the Select Standing Committee on Agriculture:

Whereas the said Committee, after due consideration, submitted its report thereon to the Legislature, embodying the following resolution: "That this Committee, while not prepared to recommend this Bill to the Legislature this session, believes it desirable that an independent and complete investigation be made into the matters involved, with a view to having the question considered again next session":

Whereas the matters covered by the said report are connected with the good government of the Province, and the Lieutenant-Governor in Council deems it expedient to cause inquiry to be made into and concerning the same:

And whereas by an Order of the Lieutenant-Governor in Council dated the 19th day of May, A.D. 1928, it is directed that a Commission under the provisions of the "Public Inquiries Act" be issued to you, Frederick Moore Clement, Hibbert Winslow Hill, and George Ernest Hancox, appointing you to be Commissioners to inquire into the matter of milk production, distribution, prices, and sale in the Lower Fraser Valley, in the said Province, and competing districts, with particular reference to the whole question of milk-supply as it pertains to the City of Vancouver and adjacent and neighbouring municipalities, and to report what you find with reference to the matters comprised within the inquiry, and as to any legislation considered necessary in respect of the same:

NOW KNOW YE that, under and by virtue of the powers contained in and conferred by the said recited Act, and of all and every powers and power vested in Us in that behalf, and by and with the advice of Our Executive Council, We, reposing trust and confidence in your loyalty, integrity, and ability, do hereby confer upon you, the said Commissioners, the powers of making inquiry into all and every the matters aforesaid, with authority to summon such expert witnesses as you may deem necessary on such inquiry.

And We direct you, the said Commissioners, to report in writing the facts found by you to Our Lieutenant-Governor of Our said Province immediately or as soon as conveniently may be after you shall have concluded such inquiry, and the opinions which you may have formed in relation to the matters aforesaid as the result of such inquiry, with such recommendations as you may think proper.

IN TESTIMONY WHEREOF We have caused these Our Letters to be made Patent, and the Great Seal of the Province to be hereunto affixed.

WITNESS, His Honour ROBERT RANDOLPH BRUCE, Lieutenant-Governor of Our said Province of British Columbia, in Our City of Victoria, in Our said Province, this 19th day of May, in the year of our Lord one thousand nine hundred and twenty-eight, and in the nineteenth year of Our Reign.

By Command.

(Sgd.) T. D. PATTULLO,
Provincial Secretary.

Approved July 16th, 1928.

To His Honour the Administrator in Council:

The undersigned has the honour to recommend that Order in Council approved on the 19th day of May, 1928, and numbered 504, be amended as follows:—

By striking out all the words of the fourth paragraph thereof after the word "inquire" in the ninth line of said paragraph, and substituting therefor the words "into the matter of milk and milk products, production, quality, by-products, supplementary products, surplus, distribution, supply, prices, and sale in the Lower Fraser Valley, in the said Province, and competing districts, and, without derogating from the foregoing, with particular reference to the whole question of milk and milk products as it pertains to the City of Vancouver and adjacent and neighbouring municipalities, and to report what you find with reference to the matters comprised within the inquiry and as to any legislation considered necessary in respect to the same."

Dated this 14th day of July, A.D. 1928.

E. D. BARROW,
Minister of Agriculture.

Approved this 14th day of July, A.D. 1928.

J. D. MACLEAN,
Presiding Member of the Executive Council.

REPORT OF MILK INQUIRY COMMISSION.

1. HOW THE EVIDENCE WAS OBTAINED.

The Commission called a representative group of men and women to give evidence and addressed letters with questionnaire and affidavit attached to many others. In all, eleven health officers; eleven physicians, milk specialists, and bacteriologists; five Government officials; twenty-four dealers and distributers; forty-six dairymen; nine representatives of transportation companies and individual truck-drivers; and twelve feed merchants and grain specialists were called as witnesses.

The evidence was reported verbatim and comprises 3,764 pages of transcript. In addition to the evidence in the transcript, there were filed as exhibits 226 documents, many of them lengthy and of a confidential nature. Nine briefs setting forth the grievances of the various interests, and offering suggestions for improvement of the milk problem, were submitted and have been given consideration.

All the larger distributing companies were asked to file information on the following: Statements showing milk receipts in gallons or pounds butter-fat, by months, for the past eighteen months (ending June 30th, 1928); settling rates by months at rate per pound butter-fat, with the people the milk was purchased from; amounts of milk sold in bulk by months; the price per gallon or per pound butter-fat received for the same; the amounts sold as butter by months; the retail distribution costs from the time the milk is loaded on the wagon till the consumer gets it, for the same period, the cost to be stated in cents per quart; statements showing the amounts of milk purchased from varous shippers; amount rejected at the platforms; disposition of the surplus by way of cream and skim; reports of tests made by the city; load value per wagon per day; annual statement; number of farms from which milk is secured, and that grade A, B, and C; quantity of milk received from various points, Lulu Island, Hope, Agassiz, etc.; daily returns of milk from delivery-wagons for past eighteen months; list of retail stores to which milk or cream in bottles is sold; amount sold to each per week, per day, or per month; amount or percentage returned; what becomes of the returns; wholesale price to retail stores for the past eighteen months; names of restaurants, hotels, etc., to which milk is sold at the present time; amount sold to each and contract price per gallon or per pound butter-fat for past six months; is your dairy running at full capacity; if not, how long have you not been up to full capacity; at what percentage of full capacity are you running; what quantity in pounds butter-fat or gallons would bring you up to full capacity?

This information was made available where possible and is held as part of the confidential exhibits.

Similar, but less extensive statements were obtained from a representative group of small distributers by mailing a questionnaire with affidavit attached. Six of the ten distributers receiving this questionnaire gave the information asked. Letters with questionnaire and affidavit attached were mailed to 177 addresses of men and women whose names had been filed as being cow-owners and possibly selling some milk. These men and women were all in Vancouver or the adjoining municipalities. Some of these letters were returned because of wrong addresses; some few people failed to reply, and others gave the detailed information required. These replies are confidential.

Most of the necessary official documents and reports were filed by health officers and Government officials. Visits were made to farms in various districts, the Utility Plant at Sardis, the Borden Condensery, and some distributing dairies; much information was gleaned from observation.

The report is based on the information as indicated above.

Fifty days were spent in public hearings and ninety-one days in private sessions and in the preparation of the report.

2. INTRODUCTION.

"Milk is our most important food. It is the best single food. The exceptional value of milk is due to the fact that it contains all the essentials of a balanced diet; it is rich in vitamins, the quality of its protein is especially good, the fat favours growth, and it has a high calcium

content in readily usable form. Milk, furthermore, is palatable, readily digestible, and is subject to a great variety of modifications. Even at present prices, it is one of the cheapest of the standard articles of diet and the most economical source of protein. Milk is a protective food, in that it guards against deficiency diseases when used in combination with other foodstuffs of either animal or vegetable origin.

"Those peoples who have employed the leaf of the plant as their sole protective food are characterized by small stature, relatively short span of life, high infant mortality, and by contented adherence to the employment of the simple mechanical inventions of their forefathers. The peoples who have made liberal use of milk as a food have, in contrast, attained greater size, greater longevity, and have been much more aggressive than the non-milk-using peoples, and have achieved much greater advancement in literature, science, and art. They have developed in a higher degree educational and political systems which offer the greatest opportunity for the individual to develop his powers. Such development has a physiological basis, and there seems every reason to believe that it is fundamentally related to nutrition." (Quoted from E. V. McCollum and N. Simmonds, "The Newer Knowledge of Nutrition," 3rd Ed., Macmillan, New York, 1925.)

"While good milk has done more than any other single food to obtain and maintain health, bad milk was formerly responsible for more sickness and deaths than perhaps all other foods combined. In view of the many advantages and few drawbacks, sanitarians unanimously encourage the production and use of pure milk, and discourage the distribution and use of poor milk. It is the only food for which there is no effective substitute." (Rosenau, "Preventive Medicine and Hygiene," 5th Ed., Appleton & Co., New York, 1927.)

SAFETY AND QUALITY.

3. COMPOSITION.

Milk* is an aqueous secretion of the mammary glands† found in the females of all warm-blooded animals,‡ from mouse to whale. It is ordinarily produced immediately following, and for some time after, the birth from a female of one or more young.

Pure milk contains, *suspended* in the water which forms its basis, more or less fat§ and more or less protein;‖ also, *dissolved* in the water, some protein, lactose (milk-sugar), various salts of lime, magnesium, and some others, and a variable quantity of vitamins;¶ finally, suspended or sedimented, some body-cells from the cow and (practically always) some bacteria.

4. FUNCTION.

The function of milk is to supply to new-born mammals nourishment direct from the mother, during the period when the young mammal is growing up to the stage where it develops teeth and digestive juices, fitting it to secure its own food from other sources. Hence the milk of each species is peculiar to that species, not only in percentage composition, but also in the exact nature of the fats, proteins, and salts present. The lactose of all milks is identical, however.

Since the milk of each species is peculiarly suited to the young of the corresponding species, it is, conversely, more or less unsuited to the young of other species. Yet the milk of some species may be substituted with more or less success for that of other species, the most notable example being the substitution of cows' milk for human milk in the case of the human baby. Failing the

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* Latin, *lac*, = milk; hence lacteal fluid (milk); lactation period (time during which milk is produced); lactose (milk-sugar).

† Called "the breasts" in the human; "the udder" in cows and goats. Latin, *mamma;* hence mammary, mammitis, etc.

‡ Mammals, so called because of having "breasts" or mammæ.

§ Called milk-fat, butter-fat, cream-fat. The character of the fat and its proportions vary much in different species—the human showing about 3 to 4 per cent., the cow about 3 to 6 per cent., the whale about 20 per cent., the guinea-pig about 46 per cent.

‖ The chief protein of milk is caseinogen—but in ordinary language, casein. The latter term technically is restricted to precipitated caseinogen such as is found in clotted milk. Protein is the substance of actual flesh (muscle, skin, brain, liver, and other organs) as distinguished from fat and carbohydrate (starch, sugar). It varies in character and proportions in different species, human milk showing only 1½ per cent., the cow 3 per cent.

¶ Vitamins are probably substances, not as yet identified chemically, but known to exist in, and to be formed by, young growing plants. They are essential to the life and growth of mammals. They are present in some of the plant-food of mammals; and, therefore, in the properly fed lactating female; any surplus not needed by her is excreted, in part at least, in the milk, and thus reaches her nursing young.

own-mother's milk, milk direct from the breast of another lactating female ("wet-nurse") or from the pooled milk of several such females is the next best; cows' milk forming the third choice, and the more common, because it is the easiest to obtain and the cheapest to purchase. It must be noted, however, that cows' milk is not the "natural food" of any animal but the calf. Nevertheless, cows' milk, *properly handled*, is the best substitute for human milk known.

5. USE BY HUMAN OF COWS' MILK.

The use of cows' milk as food for human babies is therefore an abnormality; and its use for older children and for adolescents and adults has no parallel in any species of mammal other than the human; no species other than the human using milk in nature in any form after early babyhood. In human circles it is also *the only animal food which is eaten in any quantity in a fresh, raw* state; this is chiefly done in North America; Europe using largely cooked milk, native cow-owning tribes chiefly sour milk.

The consumption of cows' milk as a regular part of the dietary is not by any means universal in the human race, being now practically unknown among the Chinese, the Japanese, the British Columbia Coast Indians (who use it, however, in canned form), the Eskimo, and in older days amongst the North American Indians generally, previous to the introduction of cows amongst them by white invaders.

On the other hand, cows' milk has for centuries formed one of the chief foods of the Tartars and of certain African tribes—generally in the form of sour milk, curds, and various derivatives of milk, including cheese. The latter has long been a staple food of various European and British peoples, especially the peasantry.

Amongst the modern whites of the British Empire, Canada, the United States, and racially allied peoples, the use of fluid milk as a beverage at all ages, of milk products in many forms, such as cream, ice-cream, condensed and evaporated milks, cheese, butter, and of milk in various mixtures with other foods, such as custards, soups, cakes, and bread, is very extensive, ranging in quantity from ½ to nearly 1 pint per head per day, as a rule.

6. SUMMARY.

Milk contains representatives of all the principal foodstuffs—proteins, fats, a carbohydrate, salts, vitamins, water. The milk of a given species is a complete and even a "perfect" food *for the young of the corresponding species.* But it is neither a complete nor a perfect food in any exact sense for the young of other species, nor for the older individuals of any species.

Cows' milk is a good, though not an essential food for the human after babyhood. In a modified form it is a good substitute for human milk during babyhood, and the best we have.

CHARACTERISTICS OF PURE, FRESH, RAW COWS' MILK.

7. PHYSICAL CHARACTERISTICS.

Milk as drawn from the cow (preferably the full content of the udder of a healthy, lactating cow, neither at the beginning nor the end of her lactation period) is a warm, slightly yellowish, opaque, white fluid, having a slight characteristic odour and a bland, rather neutral taste.

On close physical and chemical examination it is found to consist of water, about 88 per cent. by weight, and various solids, about 12 per cent. by weight.

The water of milk is purely and simply ordinary water, and nothing else; in it float the fat in minute globules, about 3 to 4 per cent. or more, and the casein in minute particles, about 3 per cent. To these two substances is due the yellowish-white opacity of the milk. If, now, the fat alone be wholly removed, the remaining 96 per cent. of the original milk will still be opaque, but will have a less thick or dense appearance, and will be a bluish rather than a yellowish white. The opacity now remaining is due solely to the particles of casein still floating in the milk-water. This portion of the milk (i.e., the whole milk deprived of its fat) is known as "skimmed milk" or "skim." It consists of the original water of the milk, and of all the solids, except the *fat.*

If the casein also be removed by any process (e.g., by the use of rennet, as in the preparation of junket, or by various other chemical or physical processes) the original milk will be further reduced to about 93 per cent. of its original weight, and will now appear as a clear watery solution (whey) of the solids other than fat and casein—namely, the lactose and salts, with some vitamins and ferments.

The various constituents and combinations may be thus tabulated:—

COWS' MILK.

- Whole milk
  - Water, 88%
  - Solids, 12%
    - Solids not fat.
      - Fat, 3–4% } in suspension in the water.
      - Casein, 3–4% } in suspension in the water.
      - Other proteins, albumin, mucin, etc., traces } in solution in the water.
      - Lactose, 5–6% } in solution in the water.
      - Salts } in solution in the water.
      - Vitamins } in minute amounts
      - Ferments } in minute amounts
      - Cells from the cow } formed elements.
      - Bacteria } formed elements.

Whole milk minus most of the fat = skimmed milk ("skim").
Whole milk minus fat and casein = whey.
Fat (with some "skim") = cream.

8. CREAM.

Cream is usually obtained by letting the whole milk stand quiet for a time, with the result that the fat, being lighter than the rest of the milk, rises towards the top, and may be more or less completely removed by mechanical dipping or "skimming"; or, without this delay, the fat may be separated still more completely from the rest of the milk by centrifugalizing ("separating") the whole milk in a special device (e.g., cream-separator). The principle is to whirl the milk rapidly about a centre, throwing the relatively heavy water containing the casein and other solids, not fat, to the outside, leaving the relatively light cream to gather at the centre, from whence it is drawn off into a separate receptacle.

But in neither method is all the fat obtained, nor is the fat which is obtained freed wholly of the other constituents of the milk. Therefore, ordinary cream is not 100 per cent. fat, but only from, say, 18 to 40 per cent. fat; nor is the skim-milk wholly solids-not-fat plus water, for it contains some residue of unseparated fat also.

9. NUTRITIVE VALUE OF INDIVIDUAL CONSTITUENTS.

Taking the constituents of cows' milk one by one, we find that fat furnishes nearly one-half of the total *fuel* value of the whole milk, all the rest of the milk furnishing the other half. But of course the fat furnishes very little of the body-building material, since body-building power is confined almost wholly to proteins. Cream, because it consists of 18 to 40 per cent. of fat, together with some of the rest of the milk, is a "*strong*" *fuel*, but because it contains only a relatively small amount of the rest of the milk is a relatively "*weak*" *body-builder*.*

Thus, if the fat be wholly removed from milk, half the milk's fuel value, as above stated, is removed also; but the remainder of the milk contains not only the other half of the fuel value of the whole milk, but also most of its body-building power; i.e., all of its protein. In ordinary skim-milk not all of the fat is completely removed; hence "skim-milk" contains slightly more than half the fuel value of the original milk, as well as, of course, most of its body-building value. Thus is explained the well-known thriving of calves—and human babies also—on skimmed milk. The skimmed milk furnishes sufficient fuel despite the loss of the fat, but also supplies the protein and salts (as the fat does not); i.e., most of the body-building material, required to make muscle, bones, and brains. If, now, the attempt were made to feed either calf or baby on the milk-fat alone, or even on the cream alone, disaster would surely follow, since they would thus receive a great excess of unnecessary and undesirable *fuel* and far too little of the much-required protein; besides suffering from digestive disturbances which would inevitably follow from the excess of fat.

Moreover, milk without fat contains all the carbohydrate of milk (lactose), as well as the salts, water, and vitamins. It is through the protein, and more especially the lactose, that the fuel value of skimmed milk is furnished.

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*Vitamin A, an invaluable adjunct to body-building materials, is closely associated with cows' milk-fat; and therefore this milk-fat is valuable in *promoting* the successful use by the body of the true body-building materials furnished from other sources—notably from the "skim."

Briefly, in whole milk, the fat furnishes about 50 per cent., the lactose 30 per cent., and the protein 20 per cent. of the total fuel value,* but the protein and salts alone can, and do, furnish the body-building power.

10. NUTRITIVE VALUE OF FAT IN MILK.

It is true that babies, children, or adults fed on fat and sugar in excess may "grow" in weight, get "fat." But this sort of "growth" is entirely different from that true growth which is due to increase of the protein of the body in the shape of muscle, brain, organs. "Growth" due to fat and sugar is merely increase in weight and size from the deposit in the body at various points (especially about the kidneys and intestine and immediately under the skin) of the surplus fat formed by these two foods when taken in excess. Taken in certain amounts, fat and sugar will be burned up at once as fuels. Taken in excess of this, the excess is not thrown out, but is stored as above described.

It is quite possible to "fatten" calves or human babies by excessive fat and sugar, but the fictitious "growth" thus achieved is secured at the sacrifice of the real growth of the necessary living tissues.

It is a great misfortune to the human race that the relative values of cream and skim-milk in nutrition are so frequently wholly misunderstood, and that it is so commonly thought that the cream is the most important and valuable constituent, the skim-milk the comparatively valueless one.

The actual facts are almost exactly the reverse of these unfortunately widespread and popular beliefs.

The practice of taking the cream for the adults and leaving the skim-milk for the children, followed in some households with a rather guilty feeling as in some sort a cheating of the children, is in actual fact a much better practice than the converse—for it gives to the adult, who needs fuel rather than body-building material, his proper share, and to the child, who needs body-building material rather than fuel, his proper share also.

The modern pediatrician (i.e., medical expert in care of the feeding of infants) recognizes the deleterious effects of excess of butter-fat on the infant, and modern practice directs that not more than about 2 per cent. butter-fat be allowed in cows' milk fed to infants.† When it is remembered that ordinary market-milk must not have less than 3.25 per cent., it will be understood that the minimum butter-fat content of such ordinary milk is nearly double that required by the infant. However much the adult may desire or demand for himself a deep cream-line, the basing of such a desire or demand on any belief concerning the needs of children for the excessive quantities of fat which such a deep cream-line is held to indicate constitutes a serious misapprehension of the facts concerning child-nutrition and child physical welfare.

A comparison of the fuel value of milk with that of eggs and beefsteak is appended; also a second comparison of the same foods as to body-building powers.

11. COMPOSITION OF COWS' MILK.

Slyke and Bosworth (I. Brit. Chem., 1915, 20.2) quoted by Rosenau, Prev. Med. and Hyg. 1927, p. 697.

	Cows.		Human.
Fat	3.900%, 9 kinds		4.00%
Milk-sugar	4.900%, 1 kind		7.00%
Proteins combined with calcium	3.200%, 5 kinds		1.50%
Dicalcium phosphate	0.175		
Calcium chloride	0.119		
Monomagnesium phosphate	0.103		
Sodium citrate	0.222	0.901%	0.2%
Potassium citrate	0.052		
Dipotassium phosphate	0.230		
	12.901		

* Transcript of evidence, page 1308.

† Transcript of evidence, pages 735, 759.

Cows' milk contains also gases in solution—oxygen, nitrogen, carbon dioxide.

There are numerous other differences between the two besides those above shown; thus, the fat of cows' milk is relatively rich, the fat of human milk is relatively poor, in volatile glycerids; the protein of cows' milk is chiefly casein, that of woman's milk chiefly lactalbumin. The salts of cows' milk are not only four times as abundant as in human milk, but also consist chiefly of calcium and magnesium salts; that of woman's milk chiefly of potassium and sodium salts. There are also many other differences.

The composition of beefsteak, eggs, and cows' milk compare thus:—

	Protein.	Fat.	Carbo-hydrates.	Ash.	Calorific Values.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	
Beefsteak, round, lean	20.2	2.4	------	1.2	475 per lb.
Eggs	11.7	10.7	------	0.7	680 per lb.
Cows' milk	3.3	4.0	5.0	0.7	325 per lb.

The relative *body-building* values per pound are practically indicated by the figures of column 1 (proteins); the relative *fuel* values by column 5 (calorific values).

CHANGES IN COWS' MILK WITH AGE.

The ordinary changes which occur in milk on ageing depend so largely upon the kinds of bacteria present and their numbers that these changes and the bacteria present must always be considered together.

12. BACTERIA IN MILK.

Ordinary pure, fresh, raw cows' milk such as described above (paragraph 7) practically always contains some bacteria (chiefly lactic-acid bacteria); i.e., exceedingly minute living things generally classed as plants, having very simple forms (spheres and cylinders) not exceeding, as a rule, 1/25,000 of an inch in diameter, nor 5/25,000 to 10/25,000 in length. These bacteria apparently have no definite sex, but nevertheless increase in numbers, generally by the simple process of elongating slightly, and then dividing into two (fission). Each of these halves then grows to the parent size, elongates slightly, and divides again into two; and so on indefinitely. This process of multiplication by fission goes on at a rapid rate under favourable conditions, which include chiefly water in abundance, suitable food, and suitable temperature. Those bacteria found in milk have, obviously, food and water in abundance. The remaining important factor of temperature depends, of course, in each case upon the temperature of the surroundings of the particular milk; i.e., on whether it is kept warm or cold.

13. UDDER-MILK.

Within a cow's udder, the milk as it forms during, say, the twelve hours between successive milkings, does not usually furnish much chance for bacteria to grow, partly because there are seldom any great number of bacteria present in the udder, partly because any bacteria that may reach it are likely to be restrained by certain anti-bacterial ferments in the freshly forming milk.

14. BACTERIA IN DRAWN MILK.

But when at the time of milking the milk leaves the udder by way of the teat, it picks up in its passage through and out of the teat some of the bacteria usually present in the teat near its tip; and as soon as the milk emerges into the outer world it is practically certain to encounter, in the air, and on the hands, utensils (such as pail and cans), and other things with which it comes in contact, bacteria of many kinds, including lactic-acid bacteria and others from many sources. These bacteria, at first restrained somewhat by the anti-bacterial ferments of the fresh milk, later, as these disappear with the ageing of the milk, flourish exceedingly in the milk, especially if it be allowed to remain warm as it comes from the cow. Under circumstances favourable to the bacteria, multiplication, each germ dividing in two as above described, may occur every twenty minutes or so. A simple calculation will show that a single germ may thus become some 1,000,000 in a few hours. Similarly, a thousand bacteria would become 1,000,000,000 in the same time. Confusion between the numbers and the bulk of the bacteria thus produced

should be avoided by remembering how small the bulk of a bacterium really is. The space occupied even by enormous numbers is practically negligible—a cubic inch affording space for many billions, the exact number of billions depending, of course, on the exact size of the particular bacterium concerned.

The lactic-acid bacteria tend to sour the milk; other kinds produce other changes, some of them tending to putrefy or rot the milk. Occasionally also disease-producing bacteria may be introduced, making the milk actually infective.

15. PRECAUTIONS AGAINST EXCESSIVE BACTERIA.

Hence the extreme necessity for keeping objectionable germs out of the milk as much as possible, and for giving to those which enter as unfavourable circumstances as possible, in order to minimize their increase. Since neither the food nor the water in the milk can be altered or affected so as to make them unfavourable to bacteria without also preventing the use of the milk as a beverage, the only remaining factor that can be dealt with to this end is the temperature.

The addition of actual chemical antiseptics is forbidden by law, because of their possible deleterious effects on the human consumer; while sterilizing the milk by prolonged heating at a high temperature, although it may be so conducted as to be absolutely efficacious in destroying all bacterial life, also alters the taste and colour of the milk to an extent disagreeable to many human consumers. Other treatments, such as enormously high pressure and irradiation, have been tried in the attempt to destroy the bacteria without altering the milk's commercial value as a beverage, but so far have not proved fully practicable.

An approximation to sterilization without the above disadvantages is achieved by pasteurization; i.e., by heating the milk to a relatively low temperature (142° to 145° F.) for thirty minutes.

This treatment kills all bacteria producing ordinary disease, and also reduces other bacteria very materially, thus first rendering the milk safe, and then prolonging its keeping qualities, since such bacteria as are still present must multiply for a considerable time before reaching such large numbers as materially to affect the character and composition of the milk.

But ordinarily the bacteria in milk do finally grow sufficiently to change it, and usually in the direction of souring.

16. SOURING OF MILK.

In order to understand just what changes occur in milk, raw or pasteurized, it is necessary to review the subject in relation to the above facts.

The most notable change in milk, observed in all countries, for hundreds of years, long before the cause (bacterial action) was at all understood or even guessed at, is the well-known souring of milk. This was at one time considered an inevitable change, inherent in the nature of milk; but is now known to be due solely to the growth in the milk of certain kinds or species of bacteria. If all bacteria are absent from the first, or are early and completely destroyed, the milk will remain fresh and sweet indefinitely, for months or years. But since the particular kinds or species of bacteria that produce souring are almost invariably present in the teats or immediate external surroundings of the cow, they almost inevitably enter the milk. Therefore, unless the milk is completely sterilized, the bacteria almost inevitably and universally sour it, sooner or later.

17. RESULTS OF SOURING.

The souring of milk is known to every one as evidenced by an acid smell and taste, and the formation of lumps or clots in the hitherto smooth, uniformly fluid milk; in time by the separation of the clots from a more or less clear, watery fluid, whey.

18. CAUSE OF SOURING.

Prolonged patient study and experiment has shown that all these characters of sour milk are dependent on one principal fact: that certain bacteria, those almost inevitably present in milk, during their actual life and multiplication secure their food from the milk itself, and at first chiefly from the lactose or milk-sugar, not from the fat or casein. In digesting or breaking up the lactose the bacteria set free from it an acid (lactic acid). This acid gives the "sour" (acid) smell and taste; and also acts upon the casein to the extent of agglutinating into masses (clots) the tiny separate particles in which the casein originally exists in the fresh milk. These

masses usually grow larger and larger as the process goes on. They do not, however, consist of casein alone, since they incorporate into themselves, as they form, the fat-globules which in the fresh milk float free amongst the casein particles.

This compound clot, of casein and fat, when fully formed, contracts; and the fluid of the milk, containing the water and the solids (in solution in the water) other than the fat and casein, is separated out from the clot as whey.

19. PUTREFACTION OF MILK.

Pure, fresh, raw milk as above defined will sometimes, as it ages, putrefy rather than sour.

This change is also due to bacteria, but bacteria of a type differing as a rule from those which sour the milk.

These putrefying bacteria differ not only in species, but also in shape and size from the souring bacteria; more important differences, however, consist in their food preferences, which are for the protein of the milk rather than, as in the case of the souring bacteria, for the lactose.

In digesting and breaking up the protein (casein, albumin, globulin, etc.) of the milk, acid is not produced as it is in souring, to any great extent; but various odours of decomposition due to the breaking-up of the protein occur, sometimes accompanied by gas. If clots form they usually differ in appearance, as does the whey, from those formed in ordinary souring.

So marked is the distinction, not only in milk, but in other solutions or suspensions of carbohydrates and proteins (meat, sewage, etc.) between the action and results of the bacteria attacking carbohydrates (in milk, lactose), and those attacking proteins (in milk, casein, albumin, globulin, etc.), that a broad term, fermentation, has come to be used for designating the former, putrefaction for the latter.

Which of these two, fermentation ("souring") or putrefaction ("rotting"), shall occur in a given sample of milk depends upon a number of factors, chief of which are, of course, the kinds of bacteria present and their relative numbers. If the souring bacteria only be present, obviously souring only can occur. If the putrefying bacteria only be present, equally obvious is it that only putrefaction can occur. But both may be present; besides which there are certain bacteria ("colon bacilli" and others) common in milk which can, and do, first ferment and then putrefy the milk, by attacking first the carbohydrate and then the protein.

Very frequently all three kinds of bacteria are present, and the outcome, as to souring or putrefaction, will then depend upon the relative proportions of each kind; which kind grows most rapidly under the conditions of temperature, etc., to which the milk is exposed; and other similar factors which may give to one or another of the species present the ultimate preponderance in numbers, and therefore in effects.

No better elucidation of this can be given than a review of what happens when pure, fresh, raw milk is pasteurized.

PURIFICATION OF MILK.

20. PASTEURIZATION.

Pasteurization of milk consists in heating all of it uniformly and completely at 142° to 145° F. for thirty minutes, then cooling it to 45° F. or less. The milk so treated is then stored in bacteria-free containers (e.g., bottles previously freed of all bacteria by steam sterilization or equivalents) and kept cold.

The immediate effects of such pasteurization upon the milk itself are so slight that neither the expert nor the layman can detect them by any known physical or chemical tests; i.e., there are no differences, physical or chemical, between raw milk and the same milk pasteurized that will enable any one readily to distinguish them by odour, flavour, taste, or appearance. Widely established beliefs to the contrary are traditions inherited from the early days of pasteurization, when the milk was heated to a much higher point; and do not apply to the pasteurization of to-day.

21. ULTIMATE EFFECT ON MILK OF PASTEURIZATION.

Yet slight differences between raw and pasteurized milks do exist. These are differences which are detectable only by prolonged and patient investigation, consisting in the feeding of experimental animals for long periods on exclusive diets of the two milks. In this way it has been found that one vitamin (the anti-scurvy vitamin, known also as the anti-scorbutic vitamin, or vitamin C), *if it be present in the raw milk*, will have been reduced or destroyed in the pasteurized milk. This point can be determined only by feeding experiments, as above referred to.

Thus, if experimental animals (e.g., rats), fed on the raw milk alone, *escape* scurvy, while those fed exclusively on the same milk pasteurized *develop* scurvy, it is clear that vitamin C was present in the former and lacking in the latter.

True, it may happen that neither set of rats develop scurvy, in which case it would seem evident that the raw milk contained an unusual amount of vitamin C, or in a special condition, and that some at least of it escaped destruction in the pasteurization process. Sometimes both sets of rats may develop scurvy; i.e., neither the raw nor the pasteurized milk contained this vitamin.

Apart from the effects on vitamin C, studies of the use of pasteurized milk in human feeding, as carried on by physicians (pediatricians) who devote themselves especially to the care and treatment of infants and young children, indicate that pasteurization improves cows' milk nutritionally for human babies by rendering it slightly more digestible.*

The general lack of vitamin C in pasteurized milk, and sometimes in raw milk, is offset in proper modern infant-feeding by the routine use, in all cases where artificial feeding is required, whether the milk be raw or pasteurized, of some fresh fruit or vegetable juice (orange, lemon, tomato) or cod-liver oil.

22. ULTIMATE EFFECT ON BACTERIA OF PASTEURIZATION.

If, now, we turn from the effects of pasteurization on the milk itself to the effects of pasteurization on the bacteria of the milk, we shall find very definite differences, some so definite as to permit of a distinction between raw and pasteurized being made quite readily and definitely by bacteriological tests.

These effects are, in general terms, the killing, by the pasteurization, of a large proportion of the bacteria in the milk; but also the killing of more bacteria of certain kinds than of other kinds.

Hence bacterial tests giving a comparison of the number of living bacteria in the raw milk with the number of those still living in the *same* milk after pasteurization will serve to identify each milk quite conclusively. This necessary estimation of the numbers of the living bacteria may be done by the plate-count. (*See* paragraph 49.)

But if a given milk, raw, is thus compared with a *different* milk pasteurized, it is possible that the two will not show a decided difference in the total numbers, since raw milks vary very much in the bacteria present, both as to numbers and kind, so that one raw milk may show as low or as high a number as another milk pasteurized.

But such milks show a definite difference in the *kinds* of bacteria present, even when the *numbers* do not permit differentiation. This is dependent on the fact that the various kinds of bacteria present in raw milk have various degrees of resistance to the heat of pasteurization; and that even different individuals of the same species show similar differences in heat susceptibility or heat resistance.

23. BACTERIA CLASSIFIED IN RELATION TO PASTEURIZATION.

These may be classified on this basis, thus:—

I. Not resistant to pasteurization (i.e., *all* individuals killed by pasteurization). This class includes:—

(*a.*) All ordinary disease-producing bacteria. (Disease-producing bacteria are, of course, only occasionally present.)

(*b.*) Colon bacilli (those already spoken of as capable of first fermenting and then putrefying milk). These are almost invariably present in raw milk.

II. Partially resistant to pasteurization (i.e., some individuals killed, others not, by pasteurization). This class is practically always present, and includes:—

(*a.*) Souring bacteria.

(*b.*) Putrefying bacteria.

III. Largely resistant to pasteurization (i.e., some killed, but others not only surviving but even growing better at pasteurization temperatures).

This class includes a now well-known and harmless bacterium (a streptococcus) which sometimes in the past has given rise to much bewilderment. It is only occasionally present, but when present sometimes survives pasteurization and therefore grows in plates made from pasteurized milk as "pin-point" colonies.

* Transcript of evidence, page 740.

24. PROTECTION AFFORDED BY PASTEURIZATION.

To the human consumer the effect of pasteurization in killing *all* individuals of Class I. (the disease-producing germs), except the rare bacteria noted below, is the most important effect of pasteurization, since it guarantees 100 per cent. *safety* from all the ordinary diseases known to be carried at times by raw (non-pasteurized) milk. These diseases include tuberculosis, whether derived from the cow (bovine tuberculosis) or from tuberculous handlers of the milk (human tuberculosis); also diphtheria, scarlet fever, typhoid fever, septic sore throat, foot-and-mouth diseases. Those few and rare diseases which theoretically might sometimes survive pasteurization include chiefly anthrax, and would ordinarily be excluded by the recognition of the disease in the cow, resulting in its immediate slaughter.

25. WHY PASTEURIZE FOR SAFETY?

It may well be asked: Why kill disease bacteria in milk, and then drink the milk? Why not utterly destroy that milk, and drink only milk entirely free from disease bacteria? The answer would be simple if one only could know in each instance, every day, which milk contains, and which does not contain, disease bacteria. But in a large milk-supply it is impossible to know beforehand which milk, if any, is infected.

Why not, then, examine all the milk, to determine if infected or not? Because of the enormous amount of milk which would have to be examined daily, and because the presence or absence of disease-germs may only under exceptional circumstances be determined by a direct examination of the milk, or by tests upon animals. Ordinarily, the difficulties and delays incidental to such tests (although of little moment in experimental work) preclude the routine determination of the presence or absence of disease-germs in the great streams of milk which pass continuously on to the consumer daily; and infected milk, therefore, usually first shows that disease bacteria are present in it by producing the disease in the human consumer.

This has occurred so often, and so often with raw milk of the highest grades of freshness and general purity, that leading pediatricians and health authorities prefer that even the most carefully produced raw milks should undergo pasteurization; or brief boiling (one minute), which achieves the same end in destroying disease bacteria if present.

(Note.—Partially or wholly soured raw milk is paradoxically safer in this regard than very fresh, pure raw milk, since the acid produced by the souring bacteria tends to destroy the much more delicate disease-germs. It has long been noted that, on this account, epidemics from infected raw milk were relatively rare in the great cities where the raw milk was comparatively old and sour, while relatively common in small towns and rural communities where the milk was comparatively fresh and sweet.)

26. PASTEURIZATION AND SOURING.

Classes II. and III. of the bacteria are not of great importance to the life and health of the consumer, but are of considerable commercial and dietary importance to the milk-dealer and the cook.

This is true because the bacteria of Class II. (*a*) (souring bacteria), if preponderant in the milk after pasteurization, will in time sour the milk, and thus make it suitable for special uses in dietary or in cooking, while Class II. (*b*) (putrefying bacteria), if preponderant, will spoil the milk for human consumption, because of the disagreeable decomposition products which may result.

Which of these two kinds, the souring or the putrefying, will preponderate in a given pasteurized milk, and therefore result in the pasteurized milk, on ageing, becoming sour or putrid, will depend on the relative abundance of the two kinds in the raw milk before pasteurization occurs. Careful observations* made for the purpose over long years on many samples show that both raw milks and pasteurized milks will usually sour, but sometimes will putrefy, and that souring and putrefaction occur with equal frequency in both raw and pasteurized milk.

Thus, if part of a quart of fresh raw milk is pasteurized, the rest being kept in its original condition, and both the specimens are kept under like conditions, then if the raw milk sours, the pasteurized one will usually sour also; if the raw milk putrefies, the pasteurized one will usually putrefy also. In both cases, however, the pasteurized sample will (under parallel conditions) usually remain unchanged longer than the corresponding raw milk.

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* Transcript of evidence, page 1532.

27. PASTEURIZATION AND PUTREFACTION.

What, then, influences the raw milk (and the pasteurized derived from it) to follow on, respectively, to souring or to putrefaction? The answer is, the relative numbers of the souring bacteria originally present compared to the numbers of putrefactive bacteria originally present. This in turn depends on the relative "cleanliness" of the milk; for the souring bacteria, as already stated, practically cannot be excluded from milk, and are therefore practically invariably present in appreciable numbers; while the putrefactive bacteria, although almost always present, may be very greatly decreased by such cleanliness in milking or of utensils as will prevent the introduction into the milk of such substances as manure, soil, and other like "dirt."

Hence it is that an ordinarily clean milk tends to sour, while the dirtier it is the more likely it is to putrefy.

28. OLD-FASHIONED PASTEURIZATION.

The pasteurized milk of early days tended rather to putrefy than to sour; and the belief then established remains as a tradition to-day—that pasteurized milk always putrefies, never sours. The reason why the pasteurization of early days so generally resulted ultimately in putrefaction rather than in souring depended upon the fact, already elsewhere stated, that in those early days the pasteurization temperature was much higher than is prescribed to-day; i.e., 170° to 180° F. then, as against 142° to 145° F. now.

Hence the souring bacteria, which to-day in part survive pasteurization, in those days were all, or almost all, destroyed. This left none, or very few, to grow. But the putrefying germs (in "spore" form, which is very resistant) survived those temperatures as they do to-day; and when they began to grow after the pasteurized milk was cool, they had the field practically to themselves. Hence they almost invariably multiplied freely and produced unhindered their putrefying effects.

But following modern pasteurization, the souring bacteria which in part survive, usually grow much faster than the putrefying germs, and may overwhelm them completely. These two factors then usually result in the milk souring before it has a chance to putrefy; the souring also tending to prevent it from putrefying.

But even to-day, if the putrefying germs (as in a very dirty soil-and-manure-contaminated milk) happen to be very numerous, they may develop fast enough, despite the souring bacteria, to overwhelm the latter, so that putrefaction, instead of souring, occurs.

CLEANLINESS OF MILK.

The following are very important distinctions:—

1. "Dirty" milk is by no means necessarily unsafe milk.
2. "Clean" milk is by no means necessarily safe milk.
3. The dirtiness of a milk may harm the milk, as to appearance, odour, flavour, or keeping qualities; but may do no active harm to the consumer.
4. The cleanliness of milk helps to secure and preserve a good appearance, odour, flavour, and keeping quality; but does not ensure freedom from disease-producing power.
5. A "dirtily-produced" milk is more likely, other things being equal, to be infected, but *if infected* is less likely to preserve and carry infection than a "cleanly-produced" milk.
6. A "cleanly-produced" milk is conversely less likely, other things being equal, to be infected, but *if infected* is more likely to preserve and carry infection.

29. CLEAN MILK.

"Clean milk" and other similar phrases are very prominent in all discussions of the quality of milk; and quality enters all discussions on milk from whatever angle it is considered, commercial, economic, or agricultural.

But the frequency of use of the term "clean" does not always indicate or correspond with a clear notion of just what "clean" milk, or "cleanliness" of milk, really mean. Still less often is any clear notion to be had as to the processes necessary first to get, then to preserve, and finally to deliver to the consumer really clean milk.

Clean milk, as already described, is, ideally, udder-milk (milk as it is in the udder) of a healthy, normal cow; i.e., milk and nothing else. To separate this from the cow without adding *anything* to it is very difficult, but has occasionally been done, by passing up the sterilized teat

of the cow a sterilized tube through which the milk as it is in the udder flows down into a perfectly clean sterilized receptacle without contact with air, or only with dust-free, sterilized air. Such milk is milk, and milk only, pure raw milk—and will keep for years, in the same conditions as when drawn, if not allowed to dry up.

30. DIRTY MILK.

In the above strict sense, a *perfectly* clean milk is a practical impossibility; for milk drawn through the teats without a sterilized tube, as above described, necessarily comes in contact with the walls of the teat-duct and therefore practically always with extraneous matter (bacteria of the teat), which, however few in number, soon multiply in the milk. The milk is no longer strictly "clean." It will infallibly sour or rot as the result of the development of these bacteria.

On leaving the teat the milk enters the air on its way to a receptacle of some kind, and practically always picks up, from this air, dust (minute fragments of *everything* in the neighbourhood) and again more bacteria.

In the ordinary barn, even in the special milking-room, the air is almost inevitably filled with fine particles from the cow (fine scales from her skin, hairs, or fragments of hairs, dried soil and dried manure, hay-dust, straw-dust, similar scales and hair of the humans present, mouth-spray from the humans, etc.). This is all extraneous matter, does not belong in the milk, but often enters it and constitutes, therefore, "dirt." With, and on, these particles are more bacteria of many kinds—those which grow in the skin and hair of the cow, and of the human; those which flourish in soil and in manure; those which grow in human mouths. These entering the milk tend to grow and add to the bacterial numbers already present.

The very act of milking itself, by hand, means the contact of the human skin (of the palm) with that of the cow's teat. Friction of one against the other dislodges minute scales of skin from both, as well as any secretion, sweat, and of course any "dirt" which may be on either, and these fall into the milk, or are rubbed down the length of the teat into the milk-stream as it emerges from the teat-end.

Since the hands of humans are used for all sorts of work, grasping and handling pail-handles, manure-fork handles, handkerchiefs, cows' tails, stanchions, and since the hands thus pick up an infinity of minute particles of all that they touch, all but the most carefully scrubbed and tended hands, washed as a surgeon washes before an operation, will infallibly transfer some of this "dirt"—human discharges, animal discharges, etc.—to the milk.

31. SAFE DIRT AND UNSAFE DIRT.

It becomes then a most important and practical problem to determine if this dirt is harmful —and at once it is necessary to distinguish between harmfulness to the *milk* and harmfulness to the milk *consumer*. The two problems are quite distinct in most cases, for it happens that almost invariably the "dirt" that will spoil the milk is not the "dirt" that will harm the consumer.

Thus, that the milk shall be of good odour and flavour and shall keep well are characteristics demanded of the milk. Whatever may depreciate these depreciates or harms the milk. But harm to the consumer does not depend upon poor odour, poor flavour, or souring of the milk. These may turn him from the use of the milk, and so deprive him of its benefits; but no active harm is done to him by the loss of the milk, or by using it despite these disagreeable features.

When milk does harm to the consumer, it is almost invariably not milk that is of poor odour, or flavour, or sour, but milk that is apparently of the best—containing, nevertheless, the power of producing disease in the consumer.

The difference between "dirt" that harms milk and "dirt" that harms the milk-consumer lies, not in the nature of the dead "dirt," the invisible straw or manure or soil or sand or hair or human discharges, but in the nature of the living bacteria which may accompany these.

Usually the bacteria which enter the milk from the teats or the air or the hands are not disease-producing bacteria. They, it is true, flourish in the milk and change it, affecting its odour, flavour, and keeping qualities, but they do not make it in any sense poisonous or disease-producing to the consumer.

32. DISEASE-PRODUCING DIRT.

But now, if either cow or milk-handler be infected with disease-producing bacteria, and if these enter the milk, then never mind how "clean" the milk may be as regards the ordinary

"dirt" above discussed, real active harm is done to the consumer by the transfer of these disease-producing bacteria to the milk, and so to his own body. Such "clean" but infected milk gives no warning of its infectiveness to the consumer by odour, flavour, or lack of keeping qualities. He, on the contrary, sees that it is good-looking, smells and tastes well, and is wholly acceptable, as judged by any standards he can apply.

Suppose, now, a frankly and obviously "dirty" milk becomes infected, as it of course may, just as easily as the "clean" milk. The appearance, odour, flavour, all may warn the consumer of the "dirt," but, as in the previous case, not at all of the infectiveness. If he drinks it, he puts into his own body both dirt and infection.

33. CLEAN MILK INFECTED.

Curiously enough, infected milk, if "clean," is really more dangerous than infected milk that is "dirty." Apart from the fact that the clean milk is more likely to be used in large quantities, the very fact that it is relatively clean means that it is relatively free of the bacteria that sour the milk; it, therefore, keeps fresh better and longer, which means that the disease-producing bacteria present have comparatively little competition with the hardier "dirt-bacteria" and comparatively little to face of the acid produced in souring; the latter being very detrimental to the disease-producing bacteria.

Hence, the disease-producing bacteria in a "clean milk" have a relatively clear field for growth. But in a "dirty" milk the dirt-bacteria are likely to be very numerous in proportion to the disease-bacteria; furnishing, therefore, competition to the latter, but, more important, manufacturing acid rapidly, the latter retarding the growth, and eventually killing the disease-producing germs. It is evident, however, that a milk ordinarily produced in a dirty manner is "more" liable to be infected by the milk-handler, if he become infected, than is a milk usually produced in a cleanly manner.

34. UTENSIL DIRT.

So far only practically unavoidable "dirt" and opportunities for infection have been considered—such as apply to all milk drawn by hand from the udder into any receptacle.

There are numerous avoidable sources of dirt and some of infection in the further history of milk as it is handled in transit to the consumer in a modern city. Details vary, but in general all such milk goes through the following processes:—

Received into a receptacle (say a pail) from the cow's udder, the milk from that cow may be at once poured into a larger receptacle (can or tank) and the same pail used for another cow; or, without this emptying, the pail partly filled from the first cow may be transferred, just as it is, to the second cow, and so on until filled. It may then be emptied into the larger receptacle, or may stand in the stable or milking-place until another pail is filled, or several pails, and then all are poured into the common receptacle. With or without having passed through the larger receptacle, the milk is next cooled—sometimes by setting the larger receptacle in cold water, sometimes by pouring the milk over a set of pipes especially cooled, as by brine, flowing through them, or otherwise; going then into a can, which is stoppered. At some stage in the transfer the milk is strained. This may be done by a strainer on the small pail, on the larger receptacle, or on the cooler. The cooled milk in the can is then ready for shipment. This may be by truck all the way or by truck to a railway. In any case the milk reaches the receiving-platform of a distributer of milk. There the cover is lifted, the milk smelled, perhaps tasted; if satisfactory as to odour and taste, it is sampled for butter-fat, perhaps for dirt, bacteria, acidity, etc., and emptied into a receptacle where it is weighed. It passes then (usually through a strainer at some point) to a receiving and mixing tank, where adjustments of butter-fat content, if required, are made. It then is pasteurized, cooled, and bottled, labelled, and placed on ice, or if it is to be used raw, it is cooled, bottled, labelled, and placed on ice. In any case the milk is finally transferred to a milk-wagon and delivered to the consumer.

While the above is correct as a general outline of the process, every item of it is subject to variation in different plants, these variations relating to almost every minute detail of method.

Thus, merely as examples of such variations, the milk may be tasted invariably; smelled only; smelled, occasional milks being tasted also. The tests may vary from butter-fat only to fairly complete chemical and biological tests, temperature, acidity, bacterial action, bacterial counts, etc., and each of these may be performed in several ways. The milk may be pumped to the mixing-tank from the weighing-vat, or may flow by gravity. The exact character and

arrangement of the pipes, pumps, valves, cooling devices, strainers, etc., naturally are seldom the same in both plants of any two distributers.

35. ENEMIES OF MILK.

Naturally, every exposure of the milk to the air gives opportunity, great or little, for dust to enter the milk. Cooling, especially when done by running the milk in a thin, wide sheet over chilled metal surfaces, tends to expose the milk very fully indeed, almost every drop of it, to dust-contamination. Sagacious precautions must be taken to offset at every step these almost inevitable opportunities for foreign matter to enter the milk, including dust, human mouth-spray, human discharges on human hands. Moreover, wherever utensils of any kind are used which come in contact with the milk, such as pails, cans, covers, coolers, strainers, pipes, valves, testing or sampling dippers, all must be most thoroughly cleansed and sterilized after each day's use, or oftener; otherwise drops or films of milk remain; these, as the result of bacterial multiplication in them, sour or putrefy, and transfer to the next fresh milk a huge load of bacteria, together with any odours or tastes developed as the result of the bacterial action on the milk.

36. HUMAN CONTACT.

In all the processes and handling through which the milk goes, "dirt" harmful to the *milk* is nowadays well guarded against; but "dirt" harmful to the *human*, and coming from human contact, by mouth-spray or by hands, is not so insistently appreciated, observed, or guarded against. It is this latter form of contamination that is most likely to be seriously harmful to the consumer, since it is by mouth-spray and hands that infection is usually introduced, when introduced at all.

For instance, the milk-cooling device already described, involving a wide, thin sheet of milk exposed to the air, may be protected from open windows through which road-dust may blow upon it, and from the dust of the floor, walls, and ceiling of the milk plant itself, by keeping the latter clean and damp. But the mouth-spray of those working about close to the milk-sheet may reach the milk without hindrance, unless special precautions are taken against this also.

37. FILLING AND CAPPING OF BOTTLESS.

It is during the final processes of filling the bottles and capping them that the last of the opportunities for serious contamination of milk with dirt or disease may occur.

In the processes concerned in filling, if the utensils be sterilized, and avoidance of exposure of the milk to the air or mouth-spray of attendants be secured, little more can be exacted. But in capping the bottles several points require minute attention.

First: That the caps themselves shall be sterile, and remain so until actually in place. They then come in contact with the milk, and therefore, inevitably, with whatever bacteria the milk contains; but, being sterile themselves, they *add* none of their own to the milk.

Second: That the caps shall be water-proof. Failing this, bacteria from the milk will grow up through the cap; also, and more important, bacteria deposited on the cap from the air, mouth-spray or hands of milk-bottle handlers and others may grow down through the cap, so that they reach the liquid milk just under and in contact with it.

Third: The milk-cap must fit *tightly* all round its edges. Otherwise, milk will ooze into any space left between cap and glass, and thus to the air, permitting then a point at which bacteria from the air, dust, or milk-handlers may enter the milk.

In order that the above points may be provided for, capping of bottles by hand must be avoided whenever possible, since the first requisite above listed is entirely negatived by such handling.

In order to provide for the complete, safe, and clean filling and capping of bottles, machinery should be employed at every step; all parts of the machinery coming in contact with the milk must be sterile; no exposure to the ordinary air can be allowed, and the caps must be water-proof and tight-fitting.

UNSAFE MILK.

38. COMPARISON WITH WATER.

Of all foods, milk is the most subject to contamination; when used fresh and raw it has been responsible for carrying disease in excess of any other one food. Comparing it with water, the only other beverage used raw on a large scale, it has, proportionate to the amounts

in which it is used as a beverage, much greater potentialities for injury to the consumer. To appreciate the proportionate uses and dangers of water and milk, it is necessary to remember that a water-supply for a modern North American city averages about 100 gallons per head per day of the population, the fluid-milk supply a fraction of a pint per head per day, or in the neighbourhood of 1/1000 as much, say about one-tenth of 1 per cent.

It is true that a very small part of the water-supply is actually consumed as raw water for drinking purposes, the amount being variable, but probably from 1 to 5 pints per head per day. The fluid-milk supply is also not all consumed as a beverage, some being used in cooking. Perhaps the actual proportions of the milk used as a beverage to the water used as a beverage would be about one to five. But in the case of water, since it is impossible to say which particular pint or so out of each 100 gallons per head per day will be used raw for human drinking purposes, it is obviously necessary that every drop of the 100 gallons must be sufficiently safe for such use. So, in the case of milk, it is equally necessary that every drop shall be safe, since a large but unidentifiable portion of it will be used for drinking purposes.

Hence the responsibility for providing safety extends to all the fluid-milk supply as well as to all the water-supply; and the bulk of the former material to be guaranteed is usually, say, about 1/1000 that of the latter.

Despite the relatively small bulk of milk which thus may be used raw daily, and the large proportions of water which similarly may be used raw daily, the chance of contamination with disease is very much greater for milk, and the precautions necessary to prevent such contamination are very much more difficult to provide for, and to carry out.

39. SAFETY PRECAUTIONS FOR WATER AND FOR MILK SIMILAR.

The outstanding menace to water and to milk is the admission to them of human execreta. In the case of milk, derived as it is in small lots from *animals*, cow or goat, the animal excreta must be considered seriously as well. In the case of water, if it can be obtained from an area free from human sewage, and preserved pure in the course of its transit to human mouths, the raw water may be consumed in safety. The mountain streams of British Columbia provide these possibilities in a degree not to be found in the rest of Canada, where water-supplies must as a rule be derived from sewage-contaminated streams and lakes, and therefore usually must be purified before use, as by filtration of the whole supply or by chlorination. Thus, outside of mountainous districts, and artesian-well districts, the populations of to-day are almost all necessarily dependent for safe water upon some purification process.

Some water-supplies may therefore be originally pure, although the vast majority require greater or less purification.

40. REASONS FOR PURIFICATION OF WATER AND OF MILK.

In the case of the Vancouver water-supply less than 300 people all told have to do in any form whatever with the water at its point of origin, and these are *all* compulsorily tested individually to exclude typhoid-fever carriers, as well as closely watched for other diseases. But in the case of *all* milk, its origin from an animal, and its withdrawal from that animal by human agencies, its transportation, handling, and delivery, all involve constant opportunities for contact with human beings. The Vancouver milk-supply is derived from approximately 28,000 cows; milked daily on 4,000 farms by, say, 8,000 different people; and from that point on handled before consumption by many more individuals daily. The daily milk-supply of Vancouver, only 1/1000 as large as its water-supply, is exposed not to the mere presence of, but to actual handling by, many times more people every day, and, except in the case of certified milk, by people not tested for health at all. The cattle, it is true, must be free of bovine tuberculosis, but except in the case of certified milk (one-third of 1 per cent. of the total) even human tuberculosis may occur in the numerous human handlers without discovery.

41. EVIDENCE CONCERNING CARRIAGE OF DISEASE BY RAW MILK.

(From the U.S. Public Health Service, Treasury Department, Supplement 62 to the Public Health Reports.)

More than 1,300 outbreaks of disease carried by raw milk have been reported since 1895. Of these more than half occurred in the United States. While obviously and unquestionably but a fraction of those which have occurred, they form an impressive list. Moreover, there is a tremendous increase in the number discovered as time has progressed; 1895–1909 yielding

only 179 in the United States; 1906–1926 yielding about 600. This not at all due to deterioration of the milk-supplies, which were, in fact, improving, but to improvement in the epidemiological methods, to the increase of epidemiologists and epidemiological investigations, and to the generally closer attention paid to public health in its various aspects, particularly to the public-health aspects of milk. The account quoted here is that from 1906 to 1926, and is confined to the United States, because (to quote the authors) "the habit of consuming uncooked milk or its products is more common here than in most other countries." Canada and the United States in this respect are closely similar, but no similarly exhaustive computation for Canada is available.

Besides the diseases here listed, others also occur; thus the total bovine tuberculosis in the human, which is almost wholly derived from the cow, and carried to the human (usually to the human child) by raw milk, has never been directly compiled. It is known, however, to give rise to about 7 per cent. of all cases of our total tuberculosis; and with the hitherto large case-rate, and death-rate from total tuberculosis, this 7 per cent. reaches an imposing figure, running into thousands of cases for the period quoted (1881–1926). Infantile or summer diarrhœa also, although now largely a thing of the past, was until of late years a very serious cause of the deaths of young children, and was in part due to neglected milk-supplies.

The outbreaks listed due to raw milk include the following:—

Disease.	Outbreaks.	Cases.	Deaths.
Typhoid	479	14,968	219
Paratyphoid	7	434	15
Dysentery and diarrhœa	6	92	5
Septic sore throat	42	21,045	139
Scarlet fever	40	3,939	20
Diphtheria	26	971	7
Miscellaneous	12	878	5
Totals	612	42,327	410

These occurred, be it noted, in a large population, averaging in the neighbourhood of 90,000,000 to 100,000,000, but when it is remembered that these outbreaks represent only epidemics *reported* in the literature, that there were many studied but not reported in the literature, and that still more outbreaks were never studied, nor reported, the part played by raw milk in human disease is seen to be far from negligible. Since persons infected but not sick (carriers) were the most common single source of the infection of the milk in the above list, it is apparent that it is exceedingly difficult to take efficient precautions against infection of raw milk as ordinarily handled.

Of British Columbia instances the most notable is the following:—*

"In the middle of May, 1928, there appeared a case of diphtheria near ——, B.C. The following morning I investigated, and as in the meantime another case was reported as suspected, I visited that too.

"As both obtained milk from the same milkman, I took swabs from the throat of the whole family, and after twenty-four hours, out of nine in the milkman's family, seven proved to be positive, including the father and mother.

"Some weeks before they had lost a child, possibly of diphtheria, but as the laboratory of the —— General Hospital was closed on account of rebuilding, there had been no swabs taken from nose or throat of the child. In the milkman's house there were positive carriers. Immediately all precautions were taken. No milk was allowed to be delivered if not pasteurized or boiled. As the man could not do either of these, the milk was taken to the —— Creamery and there pasteurized, and containers boiled, etc. No local milk-sale by the milkman was allowed.

"More cases developed and a total of eleven houses were quarantined. All these, except one, got milk from the milkman who was a carrier. In the eleven houses there were in all about thirty-seven cases.

*Quoted from sworn evidence placed before the Commission by Dr. ——, a Medical Health Officer of British Columbia.

"One day I saw this milkman milk his cows, spitting in his hands before he started to milk, and I did not wonder that the milk was infected.

"As I was certain that this epidemic was a milk-borne one, I was very much surprised to find a positive diphtheria swab from a child 3 miles away. In that locality we got another outbreak of more cases, which were all traced to contact from one child to the others.

"Investigating further, the father of this first case told me that he had brought a load of wood to a house which was quarantined for diphtheria after a few days; that he had taken his meal in the house next to the milkman's (who was the carrier).

"As far as it is possible to say, this new outbreak seemed to be caused by the visit of the father of the child to a family where persons lived who were suffering from diphtheria.

"As this is not a densely populated district (300 houses), and there is not a delivery from one milkman to all the persons living in the district, but many milk-deliverers, and the carrier only delivered milk to ten families, who all got diphtheria, it was certain that the milk was the source of infection, and that the only family who did not have milk from him, and in whose house diphtheria developed, was contact-borne as the children played together with the neighbours' children, in whose house diphtheria occurred after a time."

SAFETY AND QUALITY GRADING OF MILK.

42. MILK-FAT A SMALL FACTOR.

Previous discussion has shown that the truly essential and the chiefly valuable qualities of milk for human consumption as a beverage are largely independent of the fat content; notwithstanding that it is on the fat content as shown by the cream-line that the average consumer bases his estimate of the milk.

With this demand for the fat of milk so prominent in the consumer's mind, the amount of milk-fat which a given pint or quart, gallon or pound or ton of milk would yield came to be the basis of value for the milk as a whole, and therefore the price of milk in any form is based chiefly on its milk-fat content—its other values being more or less ignored.

It is rather curious that the valuation of a commodity of such general use as milk should be based on one ingredient only—an ingredient forming but about one twenty-fifth of the total milk, about one-third of the nutritional elements (total solids); and which furnishes but half of the fuel value, almost none of the body-building value. Such a one-sided valuation of milk might be compared to valuing meat purely on the basis of the amount of fat it showed; of buying hammers or axes purely on the basis of the length of their handles; of buying automobiles purely on the nature of their cushions; in brief, of buying anything purely on one feature without any consideration of other accompanying and equally or more important features.

43. BASES OF SAFETY AND QUALITY GRADING.

The safety and quality grading of milk is designed to estimate the value of a given milk on all of its most valuable features, instead of on only one feature, the milk-fat. The characters which a milk valuable for human consumption should show have already been discussed (paragraph 7). It is sufficient here to relist them and then show what practical tests may be applied that will determine whether or not the ends sought have been achieved. These desiderata of a high-value milk are:—

First: That it shall be a safe milk.
Second: That it shall be a nutritious milk.
Third: That it shall be a palatable milk.
Fourth: That it shall be "clean" and keep well.
Fifth: That it shall sour normally.

In brief, that it shall be, as nearly as possible, natural pure udder-milk—milk as it exists fresh formed in the udder of a normal, healthy cow, in the period of normal lactation.

The immense detail of the incessant care and the infinite precautions which must be continually exercised in order to ensure the transit of such udder-milk in its original condition from the udder to the consumers' lips have already been outlined.

44. TESTS REQUIRED.

How shall milk as received from the producer for distribution to the consumer be tested to decide if it lives up to these essentials? It must be remembered that no one test exists which

can determine in one simple, rapid operation all of these points. A number of tests must be used, each of which will determine a certain point or points, but not all; and, further, only a very small fraction indeed of the total milk received for distribution can in any case be tested, because the milk actually employed in most tests is thereby spoiled for further use, and because also of the enormous prohibitive expense of applying all tests to all individual lots of milk as they come from the individual producers. Finally, some of the most conclusive tests are so time-consuming that if no milk were permitted to be distributed until these tests were completed, the milk as it was when received and sampled would have changed so completely by the time the tests were finished that it would be now quite unfit for consumption, even though the tests, when finished, showed that the milk was excellent when received.

Hence the safety and quality of the milk to be used must be determined in practice by a series of tests which will not involve the destruction of any appreciable proportion of the milk-supply, and will indicate not so much the specific characters of this or that particular pint, but rather the general character of the whole day's supply.

45. TESTS FOR QUALITY.

Of these tests, the most important are those which will clearly indicate whether or not the milk comes only from normal healthy cows, has been handled only by normal, healthy people, and only in thoroughly cleanly ways; that too much time has not elapsed since it was drawn from the udder; that it has not been kept at too high a temperature in the interval; finally, that it has had originally the normal constituents of good milk in due proportions, and that these have not been detrimentally subtracted from or added to at any stage.

It will be noted that the milk-fat test enters into only the last of these requirements, and even then determines only one of the items involved. No contribution is made by the milk-fat to any of the characteristics of milk above outlined, except to furnish one factor as to palatability, and one factor as to nutritional value (*see* paragraph 10). Both total or actual palatability and total nutritional value must be determined on other grounds than by testing for the amount of milk-fat.

What tests, then, should be depended upon to determine completely all the important factors for safety and quality grading, and which of these are practicably available for the grading of a large milk-supply on a safety and quality basis?

Is there any single test—or two or three tests—sufficiently rapid and conclusive as to meet all the requirements, even relatively well?

46. TESTS HERE PROPOSED.

Various tests have at various times been used for these purposes. A discussion of the most useful follows:—

(1.) *Permit to produce Milk for the Fluid Market.*—Since the continuous and reliable production of good milk, day after day, from a given dairy-farm depends primarily on the use of only healthy normal cows, and since these can only be secured and maintained properly by a farmer who is truly a farmer, one who knows cattle and dairying to begin with, and is competent and willing to carry this knowledge effectively into practice, the first step in assuring a good milk-supply is to assure that a good dairyman is in charge of it.

In brief, milk production should require a permit as does any other business or trade involving important services and also important hazards to the public; and that permit, like the steam-boiler or taxicab-driver's permit, should be issued only to those who show reasonable qualifications, implying reasonable care and precaution in operation. Hence the first "test" of any given milk-supply should be the search for evidence that it is properly authorized, as indicated by the possession, by the producer, of a permit issued only to those properly qualified and equipped.

(2.) *Maintenance of Permits.*—Since the best-qualified men may be disabled, grow careless, or sell out, inspections at frequent intervals are required to see that the initial good conditions demanded by the permit are continuously maintained at a high efficiency standard. This should involve not only (as too often happens) inspections of the surroundings of the cow, but also, and far more important, inspection of the cows themselves, the personnel, and the methods.

Hence the second test of any given milk-supply should be competent reinspections, showing that all these requirements are continuously maintained at the original or higher level.

(3.) *Examinations of the Milk itself.*—Tests (1) and (2) are aimed to detect errors in the equipment and methods used; the remaining tests are those which attempt to determine the actual efficiency of the equipment and methods by their actual results in turning out good milk.

These examinations should include the temperature of the milk, since on the temperature depends, to a large extent, palatability and keeping qualities; odour and taste, which bear upon palatability and on keeping qualities; acidity tests, which further determine just how far the milk has progressed towards souring; sediment tests, which indicate actual insoluble dirt admitted to the milk, as straw, manure, road-dirt, and so forth; tests for *fat* and for *total solids*, which give useful information as to nutritional value; and tests for adulteration.

All these tests are designed to determine as nearly as may be the degree to which proper precautions in the handling of the milk, "cleanliness, cold, and quickness," have been observed; and how nearly the ideal has been reached.

All tests except the last mentioned are sufficiently simple and rapid to constitute practical tests which can be applied to the milk on receipt and before it is accepted.

47. TESTS FOR SAFETY.

None of the above quality tests, however, bear upon the safety of the milk (i.e., its freedom from those bacteria which are capable of producing disease in the consumers).

Important routine tests, not of the milk proper, but of its bacterial content, are widely used and have proved very valuable. But these tests, although bacteriological, also fail in determining the presence or absence of *disease* germs. Two of these tests, the "methylene-blue test" and the "plate-count," are tests for the determination of total numbers of some kinds only of the living bacteria present. A third, or direct microscopic count, is sometimes used, and determines the numbers present of all bacteria visible under the microscope, whether living or dead; but since the actual shapes and sizes of bacteria are not specific to given species, this method also fails to enable the direct detection of disease-germs which may be present. (Except when special methods are used, and even then, the detection of tubercle bacilli, possibly of actinomycosis, alone could be hoped for, and only these at times, unless a long series of tests be made.)

It is sometimes thought that since the available routine bacteriological tests do not detect actual disease-germs, they are therefore of no value in deciding the quality of the milk.

It is true that bacteriological methods exist for the detection of disease-germs in milk, and they are frequently employed under appropriate circumstances.

They are, however, too time-consuming for applicability to the immediate needs of a milk-supply which is daily flowing from cow to consumer. Other methods (epidemiological) for reaching the same ends are far more rapid, although bacteriological determinations as research-work and in experiments have been and are made successfully on a large scale.

Hence, tests for the *safety* of a milk—exclusion from it of disease-producing germs—depends upon quite different principles from those so far discussed; and are:—

First, the initial securing of disease-free cows and disease-free personnel, together with the maintenance of this situation through medical inspection of the personnel weekly and veterinary inspection of the cows bi-weekly.

If energetically carried out, these methods furnish a high degree of assurance that the raw milk thus produced will not convey disease to the consumer.

Owing, however, to the present inability of the most scientific medicine to detect early all disease in either cow or human; and to the fact that "carriers" exist (i.e., persons infected with disease-germs to which they are themselves immune, but which they can and do throw out of their bodies, and with which they may therefore infect others, directly or through raw foods, including pre-eminently milk); and that there exist quite a number of "carriers," even daily inspection of the cows and personnel would not be an absolute guarantee of perfectly safe milk. Such daily inspection is usually wholly impracticable and the shortcomings of the usual method, small as they are, have permitted a number of serious outbreaks, in the human, of diseases conveyed to them through infected certified milk. Such inspections are also, of course, very expensive, and account in part for the high price of certified milk.

Since for the great bulk of the milk supplied to modern populations such inspections as are called for in the care of certified milk are impossible at the prices for which milk must be sold to meet the needs of all, these methods may be dismissed from consideration for the bulk of the milk to be sold at the lower prices.

48. TESTS FOR PROPER PASTEURIZATION.

Hence, *safety* of such milk can only be ensured by tests which guarantee the proper use of a system of treatment of the milk which, while leaving it in its natural state so far as possible, yet can be depended upon to destroy any disease-germs which may be present in it.

A number of such treatments of milk have been suggested, and employed experimentally, but the only one which so far has proved both practicable and successful is pasteurization. Hence, a test of the milk to determine if it has been pasteurized is valuable. At the present time, however, the only available test is one (Ringeling's) which requires considerable time. Tests for the efficiency of pasteurization must, therefore, usually consist in watchfulness of the pasteurizing plants and methods, and particularly of the time and temperature employed.

The lessening of milk-borne outbreaks of disease which has been noted since pasteurization began to be used for large milk-supplies intended for human consumption, and the practical abolition of milk-borne outbreaks of disease amongst human consumers in those areas where all such milk is pasteurized, show that, as a practical method of obtaining safe milk, pasteurization has at present absolutely no rival.

Ringeling's test consists in examining the milk for colon bacilli, a special form of germ often present in raw milk, but always destroyed completely in milk pasteurized for the proper time (thirty minutes) at the proper temperature (142° to 145° F.). It might well be added as a test, not of the milk itself, but rather of the efficiency of the pasteurization of the milk, although, to be conclusive, the presence of colon bacilli in the milk while raw should first be proved.

49. BACTERIAL COUNTS.

Turning now to the most used of all bacteriological tests, that which has received a legal status in many enactments regarding milk, the "bacterial count," the nature of the test may be thus briefly explained:—

The "plate" count indicates the number of bacteria in the milk which are alive and will grow on the standard "plate media," at the temperature of the body. The reasons why these particular methods were adopted as most valuable would require a treatise on the subject. But the principle can be briefly stated as similar to the reading of a recording thermometer enclosed in a room, tank, etc., the temperature of which it is desired shall be known continuously.

The bacterial population of a milk may be looked upon as a sort of natural recording instrument which is practically always present in all milk, and which indicates by its numbers the history of the milk.

Thus a "low count" of bacteria in a raw milk indicates that that milk has been obtained under cleanly conditions, has been kept clean and cool, and is not of any great age.

If any one of these desiderata has been neglected the count will be high. For instance, a high count may indicate a milk originally very dirty; or one which, originally clean, was allowed to become dirty later; or a reasonably clean milk which has not been properly cooled, or has become warm again, and so on.

When high counts are obtained, simple examination of the *kinds* present will not infrequently show that the milk was contaminated in the udder of the cow itself, because of the presence in that udder of the disease garget (mammitis, or mammary abscess).

Thus it comes about that no one test of milk, other than the plate-count, so completely covers the field which other tests are designed to cover bit by bit. The result hoped for from the test is of course the "low count"; i.e., that which indicates satisfactory conditions throughout the whole history of the milk. The high count, while indicating bad conditions of some kind, does not conclusively show just what particular bad condition or conditions have obtained; e.g., whether or not the milk was originally dirty, or, being originally clean, was not kept properly cool. These points must be determined by other tests, or, better, by inspection of the conditions under which it was produced, elucidated by further bacterial tests made of those conditions themselves.

Modifications of this count, such as the reductase (or methylene-blue) test, and the direct microscopic count are employed for much the same purpose, constituting somewhat less exact, but more rapid means to the same end.

50. STANDARDIZATION OF MILK-COUNTS IN BRITISH COLUMBIA.

As already described, the bacterial plate-count is in many respects the most all-embracing and conclusive test that can be applied to fluid milk. It is the final arbiter which sums up and pronounces on the care which the milk receives throughout its history from cow to consumer. It is a delicate, laborious, and highly technical test, but its great value makes it, nevertheless, a requisite. It is obvious that this test, like all others yielding evidence on which decisive action must be based, should be applied only by fully responsible and competent trained persons, using only complete, high-grade equipment, and accurate, generally accepted methods.

Standard methods for bacterial plate-counts have been worked out, and are fully available to all laboratories through the "Standard Methods of Milk Analysis," issued by the (international) American Public Health Association.

51. COWS' MILK AS A PUBLIC UTILITY OR COMMODITY.

Due to the extensive use of cows' milk in white and allied races, above described, it is often considered as belonging to the group of "public commodities"; and milk-supplies are often referred to as "public utilities." That these classifications are justifiable may be seen from the following discussion:—

A public utility is a means, or system, or service, or mechanism (e.g., a water-supply system, a sewage-disposal system, a hydro-electric system, a street-railway, etc.), by which is furnished *something* (a commodity), e.g., water, freedom from sewage nuisance, power, transportation, which the individual citizen requires, but which, under modern community conditions, he cannot secure satisfactorily or economically by his own efforts alone. Hence the commodity is, directly or indirectly, secured by the co-operative effort of the community (government) or large parts of the community (corporations); and may be shared in by all members of the community. Such commodities are called "public commodities."

The distinction between a public commodity, as above described, and a non-public commodity is rather of degree than of kind. The tendency is to include under the head of public commodities such things as are necessary or beneficial to any large section of a community, provided the individuals concerned cannot secure equal benefits by their own individual efforts, and can share the results of combined efforts without undue detriment to the commodity or to themselves or other citizens. The mechanisms or systems by which these commodities are secured are known as "public utilities."

Since the days when individuals or individual families secured by their own labours all the commodities they at any time enjoyed—e.g., water obtained from wells they themselves dug, food obtained from animals or plants they themselves raised—specialization of work has increasingly gone on, together with community, rather than isolated living.

Increasingly, therefore, has developed the passing-over to special persons of efforts which earlier were carried on by all; and increasingly have all members of these growing communities become dependent on others for certain items of life, while themselves supplying to others certain other items of life. Increasingly also have all been impressed by the highly developed services thus made possible. In brief, scarcely any item of community life is wholly insusceptible of becoming a "public utility."

Naturally, those commodities whose production and distribution to the community are most essential or beneficial, and at the same time call for the greatest effort and capital, such as can only be achieved by combination, were first to be recognized as "public commodities"; e.g., water-supplies, street-lighting, fire and police protection, paving, hospitals, parks, wharves.

The claims of all commodities for admission to the public-commodity class have not been uniform, nor have the various commodities been uniformly treated as public and non-public in all communities. Thus water-supplies, in early days, were often considered of wholly private concern, and water was supplied by individuals to individuals by pail or water-cart; or by private corporations to private consumers by pipes.

The growing recognition of the needs for equal facilities for all citizens in a matter so essential as a water-supply to life, to health, to time-saving, to convenience, and even to leisure, led to greater developments of water-supplies, and ultimately to the abolition of private control, individual or corporate, with transfer of all control, *and also of all responsibility*, to the government; i.e., to the community as a whole.

Entering into decisions concerning the private or non-private nature of a given commodity are such features as: The degree of actual need for it; the number of those who need it; the frequency with which need for it recurs; the benefits conferred on the individual and on the community, and such-like. Thus, *water* is absolutely *essential to all life*, human or otherwise, at all ages, all the time; and in these items qualifies as a public commodity 100 per cent. To supply water of high quality and sufficient quantity to all citizens, continuously, requires combined effort on a huge scale. Hence, again, water-supplies qualify as public utilities 100 per cent. Furthermore, there is no substitute for water, and hence no splitting-up of the community demand for one of several more or less equivalent things. The question is always between water or no water, not between water and one or more substitutes for it.

Returning now to milk: Cows' milk belongs to foods, and foods as a class are as essential to the human race as water. But while foods are as essential as water, no one food is as essential as is the one drink, water. For any one food there are many substitutes; for water there is no substitute. Hence cows' milk is a public commodity, but as a public commodity ranks rather with water-power than with water in its claims to be so regarded.

The obvious fact that the modern city dweller cannot by his own efforts produce cows' milk for himself, that it must be done by others with special dairy knowledge and equipment, also tends to rank cows' milk with such public commodities. The general usefulness and many uses of milk, the high esteem in which it is held by young and old, its palatability, its high value as a substitute for human milk in infant-feeding when human milk cannot be had, the customs of white races, all combine to give to milk a high position as an integral, though not truly essential, part of modern white civilization. The use of milk is so embedded in the dietaries of to-day that its replacement would be achieved only with the greatest difficulty, and at great cost in cash and suffering; perhaps it could not be replaced wholly, and deprivation of it would constitute a permanent loss. It is, therefore, safe to say that milk and milk-supplies constitute respectively a public commodity and a public utility of high, although not of the highest, order.

There is another feature, which, if shown by any given commodity, has become, especially of late years, an important factor in favour of the classification of that commodity as a public commodity, thus placing it under public control and providing for it public responsibility. That feature is the capacity of that commodity, not only for benefit, but also for harm.

One of the greatest and most impelling reasons for governmental operation and control of water-supplies lies, not in the community benefits to be thus secured, but in the *prevention of community injury* through improper, negligent, and irresponsible conduct of the utility. Typhoid epidemics were frequently traced, years ago, to privately controlled water-supplies, and later to ignorantly controlled public water-supplies. The placing of responsibility for damage on the controlling body was a great factor in eliminating private ownership, and, later, in securing a high grade of governmental control and supervision for the express purpose of eliminating danger.

It seems obvious that the responsibility for infectious diseases caused by milk likewise lies upon the producers or other handlers of that milk for any damage it may cause, due to infection admitted to the milk while under their control. Realization of this responsibility would in itself stimulate a very real personal supervision of the milk by the responsible producer or handler.

That the danger is very considerable, and the responsibility for eliminating it correspondingly great, is shown by the accounts already given (paragraph 41).

FALLACIES REGARDING MILK.

So prevalent and oft-repeated are certain popular misunderstandings concerning milk that it has been thought well to list some of them here, with a discussion of their origins and a statement of the actual facts.

52. FALLACY 1.

That the milk "of the old days on the farm," in its "natural" state, was far better, purer, had a richer colour and superior flavour to that now obtained "under all sorts of artificial restrictions." This milk of the olden days is held to have been "natural, pure, raw" milk in contrast with the milk of to-day, which is thought of as a bluish-white, tasteless, odourless

liquid, supervised, inspected, filtered, perhaps pasteurized, or even "doctored" with adulterants, preservatives, or no one knows what.

53. FACTS CONCERNING FALLACY 1.

The average milk "of the old days on the farm" was drawn by unwashed hands from unwashed teats into open-mouthed pails, from cows bedded in the manure-mixed litter of dirty stables; it was strained, if at all, through coarse, frequently very dirty and seldom-washed cloths, shipped in miscellaneous cans, and distributed "loose" by dipping out by hand from a wide-mouthed receptacle with a dipper or pint measure what was required, and pouring this into a jug or other holder supplied by the customer. Sometimes a receptacle with a faucet for drawing off the loose milk instead of a dipper was used.

The inevitable results were that the milk as it existed in the udder of the cow before milking (the only true "natural, pure, raw" milk) was invariably mixed from the instant it left the teat with manure-particles from the unwashed teats, with the miscellaneous dirt, often including human discharges, of the unwashed hands of the milker, with the dust and droppings of the dark, dirty, cow-stable air, admitted freely to the milk, over the wide surface exposed by the use of the old-fashioned, wide-mouthed pail.

The deep, "creamy" colour and "rich" odour of the milk of childhood days was due to the dirt thus admitted to it. It is the reduction in dirt achieved by modern methods which renders modern milk comparatively light-coloured and tasteless.

In addressing a convention of Health Officers in Toronto a number of years ago, an official related the following, from the platform:—

He had secured a sample of really pure milk from the udder of a healthy cow. He sent for the head of one of the great milk firms, telling him he wished to submit for approval a very fine milk he had secured. The milk-firm head came up with great expectations, but his face fell at once when he saw the milk offered to him; he sniffed at it with disappointment, and, on tasting it, asked with disgust why he had been brought so far in such a hurry to see a milk which was not successfully saleable in competition with those already on the market.

The milk chemist having rather expected some such remarks, offered the milk-firm head a second sample to try. His eyes lighted up at once, he smelled it with pleasure, and, after tasting it, with approval asked why that sample had not been shown first. "I can sell that milk; there would be all kinds of demand for it. Tell me all about it."

The chemist then explained that the so-highly-approved milk was exactly the same as the rejected article, except that there had been added to it one drop of a dilute extract of manure.

54. ANSWER TO FALLACY 1.

The answer to Fallacy 1 is simply that all the precautions of the modern dairyman, all the restrictions and inspections, the filterings and pasteurizations, have but one end in view—namely, to realize in actuality the dream of "natural, pure milk as it is in the cow's udder"; to get from the cow in the country stable udder-milk only, and to deliver to the consumer in the city udder-milk only. At every step from udder to consumer the milk is inevitably so assailed by foreign substances attempting to enter the milk that even the most drastic measures may fail at some point in the long race from cow to consumer. Only by the exceeding care required by law for certified milk or its near-equivalents can even the ordinary dirt of cow, stable, milker, and utensils be for the most part satisfactorily excluded.

But one form of milk "dirt," the discharges of a sick milk-handler or "carrier" (the latter not even known to exist in the "good old days"), was quite overlooked until comparatively recently, and is still the most menacing to the consumer. Pasteurization renders innocuous any of this form of milk-dirt, should it find its way into the milk in spite of the precautions taken under modern conditions of production.

These excreta from the milkman or milkmaid, whether healthy or not, were a common ingredient of cows' milk as delivered to consumers in the old days. Mouth-discharges in the form of fine spray is thrown out by every one in coughing, sneezing, singing, and even speaking. When the milkman or maid talked or sang, to say nothing of sneezing or coughing, over the wide-mouthed pail, where else would the discharges of his nose and mouth go, than into the broad surface of the foaming milk laid out immediately in front of him, only a few inches distant? In the days when a milkman, asked if he washed his hands before milking, quite resented the query with the reply, "Of course not; it isn't done in the milk business," human

discharges from milkman or milkmaid (very commonly present on the hands of everybody—discharges of nose, mouth, bladder, and bowel) all of course went into the milk. This was especially inevitable when the unwashed hands were first moistened with a preliminary squirt or two of milk from the teat, in order to lubricate them—practically a washing of hands in the milk. A careful milkman would perhaps in sneezing turn his head aside and sneeze into his hand—and then use that hand for milking! What the average and especially the careless milker did can better be imagined than described.

Fallacy 1 may then be disposed of thus: It was in the old days that the consumer *almost never* received "pure, natural cows' milk as it was formed in the cows' udder," but *practically always* received udder-milk plus manure, plus stable-dust, plus human discharges, plus stale or sour particles from unsterilized utensils, plus street-dust, plus household dirt in the final jug of the consumer.

It is only to-day that even an approximation to natural pure cows' milk can be expected—milk which is udder-milk, and udder-milk only. That such milk should lack the flavour and odour of the old days is not hard to understand, but is rather an asset than a liability when the source of those flavours and odours is carefully considered.

55. FALLACY 2.

That the appraisal of a milk, the question whether to buy it or not, may rest wholly on its presenting a deep cream-line.

This, almost the only consideration taken into account by the average milk-consumer, in itself presents many subsidiary fallacies.

Perhaps the basic fallacy is the mistaken idea already fully discussed (paragraph 10), that the nutritive value of milk resides almost wholly, if not entirely, in its cream—the skim-milk being almost pure waste. Once it is realized that a full *half* of the fuel value and nearly *all* of the body-building value of the milk reside in the much-despised "skim," while the fat of the cream has to recommend it, nutritionally, only its fuel value and vitamin A, apart from its palatability, it will be seen that to decide between one milk and another on its fat content alone is entirely misleading. Moreover, a decision as to the amount of fat in a given milk, even if it were as important as is so often believed, could not be decided on mere inspection of the cream-line as it shows in a bottle of milk. Every one knows that if a bottle of milk be shaken up, so that the cream is evenly distributed as it is in freshly-drawn milk, a bottle full will show no cream-line at all, until the cream begins to rise. The cream-line will then gradually appear, but of course the longer the bottle stands, the higher it will rise, so that the first detected cream-line will gradually become shallower as the cream becomes more condensed. If considerable agitation of the milk occurs, the result will be to aggregate some of the fat into butter, which of course reduces the amount of fat still in the creamy state.

On the other hand, if some of the cream-globules be broken up under *strong pressure*, as in homogenizing milk, a very popular form of milk to-day, the cream will not again compact to the same degree as in the untreated milk, and hence will show a materially lower cream-line for identically the same amount of fat. Any one interested may compare a bottle of homogenized (3.25 per cent. milk-fat) with the untreated 4- or 5-per cent. milks, and will at once see that the cream-line on the 3.25-per-cent. milk is lower than on the 4 per cent., and about as low as the 5 per cent.

Unfortunately the average consumer does not look at the guaranteed per cent. on the label, but is fascinated by the deceptive cream-line. If he should by chance read the label, he thinks perhaps that the figures may lie, but that he cannot be deceived by his own eyes.

Final judgment as to the purchase of this or that milk should be based on information very different from that supposed to be obtained by merely inspecting the cream-line.

The first question to decide in selecting a given milk for human consumption surely is, "Is it safe?"; the second, "Is it nutritious?"; the third, "Is it palatable?"; the fourth, "Is it clean enough to ensure that it will keep a reasonable time?"; the fifth, "Will it, as it ages, sour, and so remain a valuable food, or will it putrefy, and so be lost?" If a milk meets all these questions satisfactorily, the question of whether one is to prefer a 3.25-per-cent. or a 4-per-cent. milk-fat milk becomes almost a mere question of taste. Safety certainly does not depend on the depth of the cream-line. The nutritional difference between a 3.25-per-cent. milk

and a 4-per-cent. milk is merely that the former has a *fuel* value (not a body-building value) about 10 per cent. less than the latter. Since this may be made up for by using about 1 oz. more of milk to the ordinary 8-oz. glassful, it is not of any real importance nutritionally.

Hence, greater palatability is the chief desideratum to be secured by selecting high milk-fat milk rather than low; and recognition of this by the purchaser would do much to place milk selection on a reasonable basis. It is not the intention to belittle the importance of milk-fat in milk here, but merely to state the exact facts so that the consumer may use his own judgment in selecting a given milk, and may base that judgment on modern knowledge instead of on ancient tradition. The point is that the "skim" is a very valuable part of the milk, yet its value is too often wholly overlooked. In basing milk prices chiefly, almost solely, on milk-fat value, injustice is done to both producer and consumer. A plan to adjust prices so that both milk-fat and "skim" will enter into them is laid out later (paragraph 120).

(Of the other factors mentioned, safety and nutritional value are to be determined by the ordinary consumer only by reliance on the health authorities, who alone can determine these points for milk-supplies on a large scale. The age at which the milk may sour, and whether it sours or putrefies, can be determined by the householders' own experiments, remembering, of course, that temperatures must be identical in all cases of comparison, since it would be wholly misleading to condemn a milk at 60° F. that soured early, in favour of a milk at 40° F. that kept much longer. The comparison should be made with both milks at 60° F. or both at 40° F.).

56. FALLACY 3.

That pasteurization is a processing of milk that destroys its natural odour, taste, as well as its inherent qualities as nourishment of a high grade, especially for infant-feeding. A not infrequent statement is that "pasteurized milk is paralysed milk."

57. ANSWER TO FALLACY 3.

Apparently much of the misapprehension concerning pasteurization is based on a not unnatural fear or belief that the mysterious pasteurizing process may be an elaborate taking to pieces and remaking of the milk; not definitely understood, it is true, but very radical in its nature.

As a matter of fact, pasteurization is nothing more than a heating of the milk for half an hour to 142° to 145° F., a point some 67° short of the boiling-point (212° F.) and about 40° to 45° above the normal temperature (100° F.) at which the milk is originally formed in the cow's udder. As already indicated elsewhere (paragraph 20), there is no test of the milk itself that will permit any one to distinguish between any given raw milk and the same pasteurized, except the bacterial test already described.

Great advocates of raw milk have frequently used pasteurized milk with perfect satisfaction, believing it to be raw, and have recommended it to their friends as greatly superior, being raw, to pasteurized milk! Also, raw-milk dealers, during a shortage, have at times secured pasteurized milk which they sent out under the usual raw-milk labels, their customers failing entirely to note any difference. The converse is also true, raw milk being sent out as pasteurized without detection—sometimes even meeting with complaints of a "burned taste"—a purely psychic impression derived from reading the name pasteurized on the bottle. This tradition, the existence of a "burned taste" in pasteurized milk, is one that persists from the early days when pasteurization was done at a much higher temperature than that now used—namely, at or about 170° to 180° F. Charring and a "burned taste" both did result in those days; neither result now. But the belief in their inevitability, then established, still remains—a mere superstition to-day.

Concerning beliefs as to detriments to the nutritive value of milk resulting from pasteurization (already discussed, paragraph 21), these also, when not wholly prejudiced, may have been based on the fact that the high-temperature pasteurization of earlier days destroyed the cream-line; i.e., so affected the milk that the cream did not rise as it does in raw milk. Although this failure of the cream to *rise* did not in the slightest degree affect its *presence* or *quantity* in the milk, it gave the impression to those who were used to judging the value of milk wholly by its cream-line that the cream had disappeared, because the cream-line had disappeared. Since also cream-line and nutritive value were held to be more or less synonymous, this second mistake confirmed the first.

In the present-day method of pasteurization at lower temperatures no such loss of the cream-line occurs, the cream rising in pasteurized milk to the same extent as in raw. As in the case of the "burned taste," so in this case—the tradition remains, although the origin of it no longer operates.

The idea that pasteurization destroys milk as a food for infants also probably is based on beliefs concerning the earlier forms of pasteurization, when the greater heat produced, or may have produced, changes. As a matter of fact, however, physicians of the highest standing regard the pasteurized milk of to-day as on exactly the same nutritive basis as raw, except in so far as it is slightly more digestible—and may lack vitamin C. The former point is of some importance to all consumers; the latter only to those few whose entire food intake consists of milk only. All modern practice requires that any persons, children or adults, who may be in the latter relatively small class should add some fresh fruit or vegetable juice (of lemon, orange, tomato, etc.) to their daily milk diet.

58. FALLACY 4.

That pasteurization was introduced and is advocated and employed for the sole purpose of rendering "unfit" milk saleable. In other words, that pasteurization is applied to milk of poor grades to save it from its otherwise inevitable rejection by the consumer because of its poorness, dirt, and lack of keeping qualities; and therefore that it is merely a lazy farmer's method of "getting by" with milk which with proper care would or could be used raw.

59. ANSWER TO FALLACY 4.

Pasteurization of milk was first introduced, not for the above purposes at all, but because, in Denmark, many calves were infected by the disease-germs occurring in the mixed raw milk (skim) returned from the dairies. In the dilemma between allowing their calves to starve or to become infected, pasteurization, already in use in other industries (wine, beer, etc.), was tried and was found eminently successful, killing the disease-bacteria in the milk without affecting its nutritive qualities for the calf. This experiment on a huge scale was so conclusive that the same system spread rapidly to other countries. Long years ago signs might be seen in creameries quoting the law that no milk, skim-milk, etc., should be fed to calves or hogs unless first sterilized by boiling or pasteurization.

When attention was drawn to the numerous outbreaks amongst humans of typhoid, diphtheria, etc., traceable to raw-milk consumption, extension to the human of the legal protection already afforded to calves and hogs through compulsory pasteurization was advocated. A truthful slogan of that day ran, "You must sterilize milk for a hog, but you may feed anything you like to a baby."

To secure safety to the human milk-consumer was the real reason for the introduction of pasteurization of cows' milk for human consumption. The realization that a large percentage of dairy cattle, especially of the higher-grade cattle, were infected with bovine tuberculosis, and transmitted their disease through their raw milk to humans, particularly to young children and especially to babies, greatly increased the pressure for the universal adoption of pasteurization.

Instead of the milk trade hailing pasteurization as a cheap, easy method of securing a saleable milk, great opposition to pasteurization was offered by the milk trade to the health authorities, who, on purely health grounds, strongly advocated it.

But the extension of pasteurization to butter-making, condensing, and ice-cream making, purely to enhance their keeping qualities, resulted in such improved keeping qualities for these that the fluid-milk trade awoke to the similar possibilities in their own lines, thus adopting pasteurization for such reasons lastly instead of firstly.

It is true that pasteurization will delay the souring of milk of any grade that is not yet sour, beyond the time that it would have soured otherwise. But pasteurization cannot and does not restore any milk already deteriorated to its pristine state. All that pasteurization does (already described, paragraph 26) is to greatly *slow down* the further development of the changes which end in souring; and this, not by any effect on the milk itself, but merely by killing off large quantities of the bacteria whose activities in the milk are themselves the cause of the souring.

A pure, fresh milk, pasteurized, will keep longer than the same pure, fresh milk left unpasteurized. A dirty, fresh milk, pasteurized, will keep longer than the same dirty, fresh milk unpasteurized; also the pure, fresh milk unpasteurized will keep longer than the dirty, fresh milk unpasteurized; and the pure, fresh milk pasteurized will keep longer than the dirty, fresh milk pasteurized.

In brief, although pasteurization tends to prolong the keeping qualities of all milk, its effects are best realized, and hence most welcomed by the milk trade, when applied to pure, fresh milk; i.e., exactly to the milk which every milkman hopes for in any case.

The attempt by shortsighted milkmen to use pasteurization as a cloak for poor, dirty, or old milk has undoubtedly been made, but it was so generally a failure that many milkmen now require for pasteurization as good a quality of milk as they require for the raw-milk trade. It is not uncommon to find, where both raw and pasteurized milks are sold on the same market, that the raw milk supplied for pasteurization averages a better quality than that supplied for use as raw milk. Only when raw milk is produced for the raw-milk trade under quite exceptional circumstances (as in "certified" or "preferred raw" forms) may the raw milk thus sold be of higher keeping quality than that submitted for pasteurization.

60. FALLACY 5.

That the milk of to-day does not equal that of "the good old days" in its effects upon the growth and health of the children; and that the children of to-day (especially the children of the cities) deserve pity, in that they do not know what real old-fashioned milk right "warm from the cow" is like.

61. ANSWER TO FALLACY 5.

This, like Fallacy 1, may be in part due to the very human tendency to look back with tender regret to early days, memory supplying a roseate background which obscures the disagreeable features, while enhancing the agreeable. No one who in adult life has revisited after a long interval the scenes he knew only as a child but has been greatly, perhaps painfully, impressed by the shrinkage that has occurred in the sizes of the things he remembers—the mountain of childhood has become merely a small hill to the adult; the far-reaching lake, a mere pond; the imposing school building, a small, ordinary house; and so on.

So, also, one's remembrances of "the heavy snowfalls which we no longer get" are coloured by the fact that 6 inches of snow is overwhelming to a 3-foot-high child, but is a very minor thing to a 6-foot adult. Notwithstanding that so many old people maintain that modern winters are far less severe than those of their childhood, actual cold-blooded records show no change at all in average depth or persistence.

Equally unreliable are the impressions regarding the milks of childhood days or their effects.

Cold-blooded, careful records of sickness and death show that the children of those early days were not nearly as healthy, instead of much healthier, than those of to-day. Most people will remember that summer diarrhœa of infants was the bane of the young mother. Yet that has now all but disappeared. This is but one instance of the lessened sickness and death of young children to-day, all of which is summed up in one figure, the infant mortality rate. This is the number of deaths occurring during the first year of age from a given number of births.

Where 250 to 300 children of each thousand born in the good old days died before reaching one complete year of age, only 50 to 60 die now. Surely *modern* milk cannot be blamed for sickness or death *that does not now occur!* In those good old days five children died where but one dies now. If milk was and is concerned in the healthfulness or robustness of the children at either period, it must be that modern milk is *five times better than* that of old times.

Passing from these generalities to a specific disease, nearly every adult will remember the frequency, years ago, of enlarged glands at the sides of the neck. These we know now were due to bovine tuberculosis of cows, transmitted in the raw milk to the human.

To-day these enlarged glands are relatively rarely seen, and their decline and near disappearance has corresponded closely with the increased employment of pasteurization of milk which killed the special bacteria concerned in causing bovine tuberculosis. This disappearance, remember, of these glands corresponded with the growth of pasteurization, not with tuberculin-testing of cows. The latter was too recently introduced to have its effects demonstrated in this way, for the decline began long before tuberculin-testing became widespread.

62. INSPECTION *VERSUS* PASTEURIZATION.

In a population of 4,000 farms there will be at least 20,000 people, allowing to each farmer only a wife and three children and no hired help.

Amongst such a population of 20,000 people, 12,000 of them children, it is easy to see the chances for the development somewhere amongst them of "children's diseases" as well as of adult disease during every year. At some time, day by day, month by month, year by year, a proportion of these farms will certainly be invaded by colds, influenza, pneumonia, diphtheria, or other ills. The actual milker may be affected; but without this, if his wife or children are infected, and before it is known from what disease they are suffering, he will be in close contact with them, and yet, inevitably, twice a day in close contact with the milk also.

His farm may have been inspected the day before his wife or child or himself sickens, or some infected person is hired to help. The inspection of barns, stables, stanchions, ventilation of stalls, feed, cleanliness, disposal of manure, milk-house, all may have been fully satisfactory. The milkman may wear clean clothes at each milking, may even wash his hands before he touches a teat; but, nevertheless, if he have diphtheria bacilli in his throat and coughs or sneezes, or even talks over the exposed milk, he may infect it. If his hands become smeared with his own discharges in any of the many ways this may occur, it is almost inevitable that the liquid milk should be in contact with his hand or with something, can, pail, or cooler, which his hand may touch.

Inspection once, twice, four times, eight times a year, even if devoted to the health of the cows and the health and freedom from infection of the milkers, could not possibly guarantee their innocuous condition at any time except just at the moment. In the case of new help, each would require equal examination.

In the case of certified raw milk, such inspections of the milk are made weekly, an important item in the protection of the milk, and also in its relatively great cost of production.

But no ordinary inspections made of *farms* contemplate the examination of the actual *cows* or actual *milkers* for infection dangerous to the milk, except in the case of certified milk or supervised near equivalents; and such milk constitutes not more than 5 per cent. of the total.

Even in the case of certified milk, with weekly medical inspections of the help and bi-weekly veterinary inspections of the animals, infections may spring up between inspections, and the damage be done to the daily outflowing stream of milk before the infection is located or even suspected; although such inspections certainly tend to reduce the possibility of infection to a minimum.

It is for such reasons that the purification of milk by pasteurization is seen to be no more than a reasonable precaution; no more than that exercised in the purification of contaminated water-supplies, now a matter of course in all progressive countries.

63. HOMOGENIZED MILK.

Homogenization consists in driving cream or milk under heavy pressure through very small apertures. This results in breaking up the globules of fat, of which the cream normally consists, into smaller globules, with the effect that such cream rises in the milk more slowly and much less completely than a normal cream. Thus, where a normal milk in a bottle would show on standing, say, 2 inches of cream, the same milk with its cream homogenized would show in the same bottle, say, 3 inches of cream. True, there would be exactly the same amount of actual milk-fat in each case, but the latter (homogenized), *judged by the cream-line*, would appear to have half as much again of cream as the former.

In actual practice the term "homogenized milk" is applied to a milk which is made up of ordinary milk from which about half the cream has been removed; this removed half "homogenized" and the now homogenized cream returned to the otherwise unaltered cream and milk from which it came. Evidently then "homogenized milk" is a misnomer, since it is only the cream, and only one-half of that, which is really homogenized; only 2 per cent. of the whole bottle of "homogenized milk" (one-half the cream) has been homogenized at all. The rest of the cream and all of the "skim" remains unaltered. Nothing has been added to or subtracted from the original whole milk. All that has been done is to convert half the cream-globules into a finer condition, so that they do not rise so high as is usual for normal cream. They thus give the appearance of a deeper or lower cream-line, and suggest that there is, therefore, extra cream in the bottle, which, however, is obviously not true.

Explanations are sometimes offered to customers to the effect that homogenization forces more air into the cream, but this is quite as fallacious as the idea that the cream itself has been increased in quantity. If normal cream be allowed to rise and then be completely removed from a bottle of normal milk; and if from another bottle of the same milk, "homogenized," the "cream" be removed also, on comparing the amounts removed it will be found that while the homogenized cream occupies more bulk, it contains exactly the same amount of butter-fat as the other, its greater bulk being due merely to the greater amount of "skim" in which the fat-globules float.

Such "homogenized milk" cannot be said to have any advantages whatever over normal milk, except in the agreeable feeling which the customer may have that he is getting "a lot more cream than the other fellow"—a feeling quite as fallacious as it is agreeable.

On the other hand, "homogenized cream" is a term applied to a milk to which has been added about enough cream to rather more than double the ordinary percentage after which the *whole* is homogenized, original cream, added cream, "skim," and all. This "homogenized cream" might well be named "*homogenized milk*" since the whole of the milk is homogenized, in contrast with what is called "*homogenized milk*," of which, as described above, only one-half of the cream and none of the other milk is homogenized.

"Homogenized cream" does not show any cream-line at all, notwithstanding that the actual cream in it is more than double normal, because the homogenization of the relatively large amount of cream suspended in the relatively small amount of the rest of the milk or "skim" makes a stable suspension of the cream which rises so slowly and incompletely that a line between the cream and milk does not become evident to the eye.

In this homogenized cream there is no implication from the cream-line of greater cream content than usual, for no cream-line forms at all. The actual milk-fat content is stated on the label, and the buyer may therefore know for himself exactly what he is getting. There is, indeed, no other way for the ordinary buyer to decide this question. It is true the milk-fat content is printed on the label in the case of homogenized milk also. But in this case it is usually disregarded, since the low cream-line is so evident and impressive that the label is rarely inspected or considered by the buyer.

The quality objections to the homogenizing of either milk or cream seem to lie wholly in the additional handling (by machinery) of the respective fluids which is involved in the process; which, of course, means just so much additional opportunity for introduction to the milk of dirt and, therefore, of bacteria. Homogenization, however, is apparently always followed by pasteurization, which, of course, offsets the danger involved and lessens the quality detriment.

In the preparation of cream for ice-cream, homogenization (with pasteurization following) is now practically universal, in order to secure a smooth "mix" for freezing. Homogenization often precedes other processes of manufacture also.

The quality advantages claimed for homogenized milk are very tenuous, a slight increase in palatability being the chief. Those claimed for homogenized cream are the same, with the additional one of greater stability, because the cream has less tendency to rise. Neither form has, however, a really essential or a highly useful feature to recommend it; the chief difference in the two being that the homogenized cream appears to be what it really is—a light cream; while the homogenized milk appears to be what it is not—i.e., an unusually rich milk.

64. COMPULSORY PASTEURIZATION.

The Commissioners, after full consideration of the whole situation regarding both the safety and the quality of the milk-supply, hold that all milk and cream for human consumption in fluid form should be pasteurized, with the exception of certified milk, and of that designated in the milk regulations as preferred raw milk, provided that the amendments to the specifications of preferred raw milk recommended by the Commission be adopted.

The National Dairy Council has recently joined forces with the Dominion Health Council in seeking universal compulsory pasteurization on economic grounds; hitherto pasteurization has been urged chiefly on safety grounds.

Should Dominion legislation to this effect be developed, Vancouver would be affected very little, since 95 per cent. or more of its milk-supply is already pasteurized. Outside of Vancouver the change would be more radical, since it is in the smaller municipalities and outlying districts that milk is still used raw to a relatively large extent.

65. THE SMALL COW-OWNER.

From the preceding descriptions and discussions of the difficulties of securing pure "udder-milk" from the cow and keeping it pure until it reaches the consumer, it is obvious that if a steady supply of pure, safe, and clean milk is to be maintained very considerable technical skill must be exercised as well as an indefatigable attention to detail, day after day, week after week. This standard applies to all milk-supplies, but particularly to milk which is to be consumed raw.

The small cow-owner is usually a raw-milk producer, and his milk therefore peculiarly requires the best facilities and the utmost precautions if quality is to be successfully maintained. But, also, he is particularly likely to lack just the best facilities, and if, as often happens, his milk business is only an adjunct to other work, he is very likely to minimize the number of proper precautions also.

True, the one-cow owner may legitimately desire the milk of that cow for his own family, but in this case as well as in the case of two-cow and three-cow herds, some milk is almost certain to be surplus and to be sold, and it is milk that is sold that we are primarily concerned with.

For those, from one-cow owners up, who wish to sell their milk, the only safe proceeding is to exact from them the attainment of the same safety and quality standards exacted of the general milk-supply. No argument can be advanced on health grounds that will justify health authorities in permitting a lower standard of safety for such milk; and no argument can be advanced on economic grounds which will permit a milk of low standard of safety and quality to be sold in competition with safe milk of standard quality.

The small cow-owner cannot, as a rule, profitably do his own pasteurization; but a way may be found for him by which his immediate investment and returns will be saved, by requiring him to ship his milk to a pasteurizing plant at standard prices; or by permitting him to distribute the milk himself, but only after pasteurization.

Such compromises should obtain only during the inevitable transition period during which the small cow-owner is gradually eliminated by the refusal of permits to new applicants and the natural gradual disappearance of the present ones. The present small cow-owner in populous areas who is able to and does produce standard milk should be permitted to continue, but no new persons should be allowed to enter the business in such areas, except those who meet all requirements of the regulations.

66. DAYLIGHT DELIVERY.

The present system of milk delivery throughout the Greater Vancouver District is very generally that known as "night" or "early morning" delivery, as contrasted with "daylight" delivery. The former usually runs from 1 a.m. to 7 or 8 a.m.; the latter from 7 a.m. or 8 a.m. until noon.

The ordinary history of the bulk of the milk is as follows: Milked on the farm about 6 p.m., the evening's milk is cooled and stored until the next morning's milking, from 4 to 6 a.m. This morning's milking is also cooled and both are then shipped, arriving at the platform about 10 a.m. to 1 p.m. Grading, processing, bottling, and cooling proceed and result in this milk being ready for distribution early *next* morning; i.e., the evening's milk on receipt by the consumer is about thirty-six hours old; the morning's milk about twenty-four hours. These two milkings are, of course, mixed in the processing.

Daylight delivery might add, perhaps, six hours to the average age of the milk on delivery to the consumer, and hence deprive him of six hours of the period during which the milk will "keep." If the milk be iced on the wagons this loss would be largely, if not wholly offset.

Daylight delivery makes inspection of wagons and milk more easy and gives the milk-wagon driver better hours. On the other hand, the present system permits delivery during hours when street traffic is less congested, and therefore probably admits of somewhat prompter service. Milk delivered in the early morning is available for the breakfast-table.

In the opinion of the Commissioners, ways and means may well be sought to secure daylight delivery, provided this can be done without increasing the cost of distribution, or the age of the milk on delivery. It is suggested that the Committee of Direction take this matter under advisement.

67. REFRIGERATION.

The Commission feels that ultimately distributers should be required to provide that milk shall arrive at the dairy platform at a temperature not exceeding 45° F. and that milk shall be delivered to consumers at a temperature not exceeding 45° F.

Both these requirements tend to extend the keeping qualities of the milk; and aid somewhat in minimizing the development of infection, should it at any time be admitted to milk to be used raw, or to pasteurized milk after pasteurization. The former, however, is by far the most definite, constant, and practically important effect of low temperature.

The Commission recognizes that at the present time such requirements would definitely add to the expense both of production and delivery, which, in view of all the efforts now made to cut those costs, would defeat those efforts without adequate returns. The question is chiefly one of keeping quality rather than of safety; and since the consumer is the only one who ultimately pays for the milk, he should express willingness to pay for the additional keeping quality thus secured before actual legal requirements to this effect are adopted.

68. MILK-WAGON DRIVERS—UNIONISM.

An important item in the retail-milk business is the man who actually delivers the milk on the consumers' door-step.

There are at any one time about 250 to 300 of these men. The only contact the average consumer has with the milk business is through him; he is, for the average consumer, the sole guide in the purchase of milk.

A proportion (75 per cent.) of these men belong to a Milk-drivers' Union which includes also certain indoor men. Although objection has at times been taken to the existence of such a union by certain distributers, the Commission is unable to draw the line between such a union and any other, such as the Co-operative Association, where men in the same line of work have united to protect and further their own interests. The Commission sees no objection to the existence of such a union. Organization is rather to be encouraged.

69. *RE* TRUCKS AND OTHER MILK-TRANSPORTATION VEHICLES.

The principles followed in the recommendations regarding the requirement of a low temperature (45° F.), for all milk when received at the platform or by the consumer, apply with even greater force to recommendations with regard to vehicles for transportation. These principles are, in brief: that since improvements in transportation affect practically only the quality of milk, not its safety, and since these improvements cannot but add considerably to that part of the cost of production which is due to transportation and delivery to the platform, such improvements should be left to the consumer to demand at such time as he may be willing to pay for the additional quality thus to be secured. Additions to present quality which may be attained by improvements in vehicles for transportation are almost negligible as compared with the advantages to be gained by low temperatures during transportation, which latter have been discussed and are not looked upon as essentials by the Commissioners. Hence, while urging improved transportation facilities, the Commission believes that such changes are not essential and may be left for future development, provided that vehicles used for transportation of milk, or milk-containers, shall not be used for the transportation of any other commodity at the same time.

LEGAL.

This section has been divided into the following subject heads:—

(1.) Federal Legislation.
(2.) Provincial Legislation.
(3.) Municipal Legislation.

70. FEDERAL LEGISLATION.

Quoting from page 11 of the transcript, and Exhibit 9: "Summarizing the situation, it is this: That the control of milk-supplies was handed over to the Province in 1922, so that the local authorities could deal with it themselves, it being concluded that ample provision had been provided in their by-laws for dealing with offenders and the enforcement is entirely in their own hands, this department (i.e., the Dominion authorities) taking no action with regard to milk unless asked to do so by the local authorities."

71. PROVINCIAL LEGISLATION.

"Creameries and Dairies Regulation Act," "Revised Statutes of British Columbia, 1924," chapter 58.

The following references to Provincial Statutes includes excerpts from the Act (some in abbreviated form) in addition to quotations from the evidence given before the Commission by H. Rive, Provincial Dairy Commissioner:—

Sec. 2. For the purposes of this Act: "'Creamery' and 'dairy' shall respectively include every creamery, dairy, milk or cream shipping-station, milk-factory, cheese-factory, ice-cream factory, milk-condensery, market-milk plant, milk-powder plant, and other premises where milk or cream is produced, received, accepted, bought, or dealt in."

Sec. 3. "No person shall operate a creamery or dairy where milk or cream is received, accepted, bought, dealt in, or paid for on the basis of the percentage of butter-fat contained therein according to any system of analysing or testing the contents thereof unless a licence therefor under this Act has been first obtained."

A small dairy producing milk which is sold in bottles would come within the "Creameries and Dairies Regulation Act." This hinges on the purchase of milk or cream on the basis of butter-fat.

Sec. 4. Power is given the Minister of Agriculture to issue:—

(*a.*) Licences to persons for the operation of creameries and dairies.

(*b.*) and (*c.*) Licences to persons who shall be known as "milk-testers" and "cream-graders."

Every institution should have in its employ an experienced and qualified tester, and in the regulations under the Act the applicants are subject to examination.

A creamery before being licensed is supposed to have sufficient equipment to carry out the necessary testing-work.

The Department of Agriculture has used Bulletin No. 14 (the testing of milk, cream, and dairy by-products by means of the Babcock test) as its guide and applicants for testers' licences are made responsible for the contents of same.

Sec. 6. (1.) The Act makes provision for rendering a proper account of the amount and value to the person who sends in the milk or cream, which account shall be certified by a tester in accordance with the regulations.

An amendment in 1924, chapter 13, section 5, provides that where the account relates to the purchase of cream, it shall state the grade allotted by a cream-grader, and shall, in addition to any other basis on which it is made up, be based on the grade of the cream so allotted.

The grades are mentioned in the regulations under the Act.

Sec. 6. (ii.) Provides for keeping correct records of weights and tests of milk and cream and the grade of cream which shall be open to inspection by the supplier and to the Provincial Dairy Inspectors, whose appointments are provided for under section 7 of the Act.

Sec. 8. The duty of a Provincial Dairy Inspector is to visit all creameries and dairies and to render whatever assistance he may be able to the owners, in respect of the production and marketing of their products; to inspect the cattle, stables, and premises of all dairies from which milk or cream is produced or obtained; to see that they are kept in a sanitary and cleanly condition, and to render aid and advice to improve dairy conditions.

Sec. 9. Provision is made for a Dairy Inspector, if he finds any cattle, stable, or premises of any dairy-farm on which milk or cream is produced, or the premises of any creamery, are being kept in a condition which he considers unfit for production, manufacture, or storage of wholesale milk, cream, butter, or cheese, by notice in writing to prohibit the owner from selling any milk, cream, butter, or cheese, the product of such cattle, or produced or manufactured in such stable or premises.

Sec. 10. "Any Health Officer, within the meaning of the 'Health Act,' may inspect any creamery or dairy in the Province."

Sec. 11. Gives the owner of any creamery or dairy the right to inspect the premises of any farmer or dairyman from whom he purchases.

The grades of cream are laid down in the regulations under the Act:—

"*Table Cream.*"—Non-frozen, sweet, and clean, for household use, and is produced under conditions that comply with the special requirements of the municipality in which it is to be sold for consumption. Acidity not more than 0.20 per cent. at the time of grading.

"*Cream for Manufacturing—Special Grade.*"—Fit for making into special-grade butter.

"*First Grade.*"—Fit for making into first-grade butter, as defined in the "Dairy Produce Act, 1921."

"*Second Grade.*"—Not reasonably clean, etc., and unfit for manufacture into butter of any higher grade than that of second, as defined in the "Dairy Products Act, 1921."

"*Off-grade.*"—Objectionable flavour or odour—unfit for making into second-grade butter.

There is no butter-fat percentage included in the grades of cream.

72. TESTS FOR THE PROTECTION OF THE FARMER.

Samples tested within twenty-four hours need not be held.

Composite samples, which must be tested not less often than every two weeks, must be held for seven days; the idea being that the farmer is permitted to receive the report of the test, and to record his objection at the creamery.

If he is further dissatisfied, provision is made for a verification test to be run. This is obtained by the farmer making application to the Minister, enclosing a fee of $5. The test will then be made by a milk-tester designated by the Minister for the making of verification tests. The milk-tester by whom it is made shall forthwith certify the result thereof and his report thereon to the Minister, the licensee of the creamery or dairy, and the person who applied for the verification test. This measure gives the farmer recourse, and his only contribution to the expense involved is the payment of the original $5 fee.

The result of the test must be reported to the farmer or owner of the milk or cream forthwith on the completion of the test.

It is to be noted that very few verification tests have been made under this regulation, for the reasons that the machinery seems too cumbersome and, in most cases, too expensive for the farmer.

There are three Dairy Inspectors under this Act, who may go into any part of the Province.

73. "MILK ACT," CHAP. 42 (1926–27). AN ACT RESPECTING THE PRODUCTION AND SALE OF MILK FOR HUMAN CONSUMPTION.

In view of the fact that this is the most important piece of legislation dealing with the subject before the Commission, it has been deemed advisable to quote from it at considerable length.

Sec. 1. Title.

Sec. 2. Expressions interpreted.

74. PROVINCIAL INSPECTION.

Sec. 3. Provides for appointment of Provincial Inspectors, who must be graduates of recognized schools of veterinary surgery.

Sec. 4. Provincial Inspectors have power to enter any premises necessary to the performance of their duties.

Sec. 5. "Every Provincial Inspector shall at intervals as regular and frequent as possible inspect within the district or districts to which he is assigned the stables, barns, milk-houses, and other premises on all dairy-farms, and the cattle kept there, and the equipment and utensils used in the stables, barns, milk-houses, and other premises, and the methods used to ensure the cleanliness and otherwise sanitary condition of the persons working or assisting in producing or preparing milk on any such dairy-farm, and of the stables, barns, milk-houses, premises, equipment, and utensils."

Sec. 6. "The Lieutenant-Governor in Council may from time to time prescribe standards for stables, barns, milk-houses, and other premises on a dairy-farm and for the equipment and utensils used there."

Sec. 7. (1.) Provincial Inspectors shall at every inspection allot marks for the condition of the dairy-farm on the prescribed score-card, and give the farmer a signed copy, stating date of the inspection and a certificate showing that the dairy-farm is classed as Grade A, B, or C, or ungraded, under this Act. (Abbreviated form.)

(2.) Where the Inspector allots not less than 80 per cent. of the total marks obtainable, he shall give a Grade A certificate, stating that the dairy-farmer may supply milk obtained from that dairy-farm for human consumption without previous pasteurization thereof. (Abbreviated form.)

(3.) Where the Inspector allots less than 80 per cent. but not less than 60 per cent. of the total marks obtainable, he shall give a Grade B certificate, stating that the dairy-farmer may supply milk obtained from that dairy-farm for human consumption after previous pasteurization thereof. (Abbreviated form.)

(4.) Where the Inspector allots less than 60 per cent. but not less than 40 per cent. of the total marks obtainable, he shall give a Grade C certificate, stating that the dairy-farmer may supply milk obtained from that dairy-farm for human consumption after previous pasteurization thereof for a period of thirty days from the date of the certificate, but after the expiration of such period shall not supply any milk obtained from that dairy-farm for human consumption until the Inspector certifies that the dairy-farm is classed as Grade A or B. (Abbreviated form.)

(5.) Where the Inspector allots less than 40 per cent. of the total marks obtainable, he shall give a certificate showing that the dairy-farm is classed as ungraded and stating that the dairy-farmer shall not supply any milk obtained from that dairy-farm for human consumption until the Inspector certifies that the dairy-farm is Grade A or B. (Abbreviated form.)

(6.) The giving of a certificate revokes any certificate previously given. (Abbreviated form.)

Sec. 8. Where a Provincial Inspector finds that a dairy-farmer is keeping the dairy-farm in a condition contrary to or is violating any provision of sections 9 or 14 to 19 or any regulation, he shall give the dairy-farmer a notice in writing specifying the violation, and shall either prohibit the supplying of milk for human consumption from that dairy-farm until the dairy-farmer complies with this Act and the regulations, or fix a period not exceeding fourteen days within which the dairy-farmer shall comply with this Act and the regulations. (Abbreviated form.)

Sec. 9. (1.) "Where, upon examination or after application of the tuberculin test, a duly qualified veterinary surgeon finds any cattle to be suffering from tuberculosis, anthrax, tetanus, or any other general or local disease so that the milk obtained from the cattle is not in his judgment safe for human consumption, the surgeon shall forthwith notify the dairy-farmer keeping the cattle and any Provincial Inspector, and thereupon the dairy-farmer shall not supply any milk for human consumption obtained from the cattle without the consent of the Inspector."

(2.) "Every dairy-farmer having any cattle which he knows to be or has cause to believe to be diseased within the meaning of this section, and respecting which no notice has been given to a Provincial Inspector, shall forthwith notify any Provincial Inspector, and shall, as far as practicable, keep such cattle separate from healthy cattle."

(3.) "On receipt of a notice under this section the Inspector shall inspect the cattle and the milk being obtained therefrom."

75. MUNICIPAL INSPECTION.

Sec. 10. (1.) "The Council of each municipality is authorized to pass by-laws for regulating and supplying of milk for human consumption within the municipality, and such by-laws may make provision:—

"(*a.*) As to the care, handling, storage, transportation, and distribution of milk by vendors or carriers:

"(*b.*) As to the construction and type of buildings used by vendors for the handling, storage, and sale of milk:

"(*c.*) As to the care, cleansing, construction, and type of all utensils and vehicles used in handling milk by vendors or carriers:

"(*d.*) For regulating the granting of licences to vendors:

"(*e.*) For the making of chemical, bacteriological, or other tests for the purpose of ascertaining the wholesomeness of milk offered for sale by any vendor or carrier:

"(*f.*) For compelling vendors to label with their respective names all bottles, containers, and cans containing milk for sale, and for prohibiting carriers from delivering milk in vehicles unless the vehicles have painted thereon in a conspicuous place, in letters not less than three inches in height, the names of the vendors of the milk carried for delivery:

"(*g.*) As to the labelling, marking, or otherwise distinguishing of milk, buttermilk, or skim-milk, offered for sale in bottles, containers, or cans:

"(*h.*) As to such other matters regarding the care, treatment, storage, transportation, distribution, and sale of milk as the Council may consider necessary:

"(*i.*) For prohibiting, except in the case of milk obtained from a dairy-farm classed as Grade A pursuant to certificate under subsection (2) of section 7, the delivery or sale of milk unless the milk is pasteurized within the meaning of subsection (1) of section 17."

(2.) "No by-law passed under paragraphs (*a*) to (*c*) or (*e*) to (*h*) of subsection (1) shall come into force until it is approved by the Lieutenant-Governor in Council."

(3.) "Where a by-law is passed under paragraph (*d*) of subsection (1), no person shall sell milk in the municipality without having first obtained a vendor's licence therefor."

This section as it stands in the present Act contemplates the passing of by-laws by Councils or municipalities regarding the care, handling, treatment, storage, etc., of milk by vendors or carriers.

In actual practice, however, milk is not only vended and carried in municipalities, but also in many municipalities is also produced within the municipal area. Since it appears that ample provision for supervision of production without the municipality is provided by the Act, it was thought well to definitely grant similar powers concerning production within the municipality as well. Hence the recommendation (pages 108 and 109) that under this section of the Act producers and production be treated, so far as supervision is concerned, on the same basis as vendors and carriers.

Paragraph (*d*) of subsection (1) of section 10 deals with the *licensing* of milk-vendors. Inasmuch as the term *licence* often is used to indicate merely a document showing that the licensee is recognized by the municipality as doing business therein, and as having paid or is subject to paying a fee for that privilege, and since such licence does not necessarily indicate that the licensee is trained or equipped for a responsible task such as that of supplying an important commodity, it was thought well that the issuing of a permit should precede the issuing of a licence; that the applicant would not be eligible for a licence until he had such permit; and that such permit should be issued by the Medical Health Officer only after investigation had shown that the applicant possessed experience or training and equipment satisfactory to the Medical Health Officer for the production of milk possessing the items of safety and quality as laid down in the Acts and regulations relating thereto.

On presentation of such a permit, the licence as ordinarily issued, for revenue, would then be grantable to those doing business in the municipality. The permit would then be a guarantee that the applicant had at least the minimum experience of training and equipment necessary; the licence would be merely a recognition that he had the permit, and also that he had paid a fee which entitles him to share in the business facilities of the municipality. (*See* recommendation No. 22.)

Sec. 11. "The Council of each municipality is authorized to appoint Inspectors for the enforcement of sections 10, 12, and 14 to 19, and the by-laws passed by the municipality under section 10, and the regulations applying to the municipality."

Sec. 12. (1.) Municipal Inspectors shall have power to see that the requirements of sections 10, 12, and 14 to 19, and any by-laws passed under section 10, and the regulations applying to the municipality are complied with, and to prohibit the sale for human consumption of milk which in his judgment is obtained, produced, treated, or handled contrary to or otherwise not in accordance with those sections or any such by-laws or regulation, and shall have the right:—(Abbreviated form.)

"(*a.*) Both within and without the municipality, to enter the premises of any vendor or dairy-farmer from which milk is supplied for human consumption within the municipality, and to inspect such premises, and the process of pasteurization, if carried out thereon, and to take for examination and testing samples of any milk found on such premises, and of the water used on such premises for cleansing any equipment or utensils:

"(*b.*) Within the municipality, to take for examination and testing samples of any milk found in a vehicle and intended for or in the course of delivery for human consumption."

(2.) "Every sample of milk taken on the premises of a vendor or dairy-farmer, or from a vehicle, shall be taken in the presence and full view of the vendor, dairy-farmer, or other

person owning, occupying, managing, or in charge of such premises or vehicle, and shall be divided into three portions, sealed, labelled, and dated by the Inspector, and one of which shall be given to the vendor, dairy-farmer, or other person, as the case may be."

(3.) The results of all tests shall be expressed in writing and filed with the clerk of the municipality, to be open to public inspection, and may be published by the Medical Health Officer of the municipality if he thinks advisable. (Abbreviated form.)

Sec. 13. The Council of each municipality is authorized to establish and maintain or assist in the establishment or maintenance of milk depots for the supply of milk to persons in the municipality. (Abbreviated form.)

76. GENERAL PROVISIONS.

Sec. 14. Employment of persons suffering from certain diseases forbidden and any Provincial or Municipal Inspector may prohibit the sale of milk obtained or sold on or from any dairy-farm or premises in which any person works contrary to the provisions of this section. (Abbreviated form.)

Sec. 15. (1.) No unclean person or persons in unclean clothing and no domestic animal shall at any time be permitted in any milk-house where milk is handled or treated for human consumption. (Abbreviated form.)

(2.) Every vessel and utensil and part thereof shall be thoroughly cleansed before being used. (Abbreviated form.)

Sec. 16. "No person shall apply the term 'certified' to any milk unless a regulation prescribing the standard for 'certified' milk has been made and the milk complies with that standard, and no person shall sell any milk as 'certified' unless a certificate authorizing that person to sell 'certified' milk is at least once a month obtained from the Medical Health Officer of the municipality in which the milk is to be consumed."

Sec. 17. (1.) "In this Act 'pasteurized' milk means milk the whole of which has been subjected for at least thirty minutes to a temperature of not less than one hundred and forty-five degrees Fahrenheit, and then at once cooled to fifty degrees Fahrenheit or under, and kept at that temperature until delivered to the consumer, and no person shall apply the word 'pasteurized' to any milk unless the whole of the milk has been subjected to such process."

(2.) "No pasteurized milk shall be delivered or sold to any person for human consumption after the expiration of twenty-four hours from the time when it was pasteurized."

(3.) "No person shall pasteurize milk which has already been pasteurized."

Sec. 18. "No person shall sell for human consumption any milk which contains less than three and one-quarter percentum of milk-fat, or less than eight and one-half percentum of milk solids other than fat, other than skim-milk or buttermilk sold as such."

Sec. 19. "No person shall sell for human consumption any milk which has received special treatment unless the milk complies with the regulations relating thereto, or, in the absence of any regulations, without clearly and distinctly advertising the special treatment."

Sec. 20. Provides for Provincial Inspector to make returns to the Minister.

Sec. 21. A Provincial Inspector shall, upon application to him by a vendor, furnish an abstract of any certificates given by him under section 7, showing the grade of any dairy-farm from which the vendor obtains milk. (Abbreviated form.)

Sec. 22. Certificates under section 7 prima facie evidence.

Sec. 23. Notices to be in writing.

Secs. 24, 25, 26. Make it an offence against the Act to refuse to admit or to obstruct Inspectors, who, however, shall, upon request, produce an authority in writing, showing that they are authorized to enter or inspect.

Sec. 27. Any person who violates any provision of Act, regulation, or by-law shall be guilty of an offence. (Abbreviated form.)

Sec. 28. Provides penalty not exceeding $50 for every offence.

Sec. 29. (1.) "The Lieutenant-Governor in Council may, for the purpose of carrying into effect the provisions of this Act according to their true intent or of supplying any deficiency therein, make such regulations as appear necessary or advisable.

(2.) "Without thereby limiting the generality of subsection (1), it is declared that the power to make regulations shall extend to:—

"(*a.*) Providing in unorganized territory for the matters mentioned in paragraphs (*a*) to (*c*) and (*d*) to (*h*) of subsection (1) of section 10 in respect of which by-laws may be passed under that subsection.

"(*b.*) Prescribing grades and classes of and standards for milk, including certified, pasteurized, and treated milk:

"(*c.*) Prescribing standards, methods, and equipment for making tests of milk and water, and providing for recording the results of such tests:

"(*d.*) Authorizing any officer, employee, or appointee of the Provincial Board of Health to exercise and have, mutatis mutandis, in any unorganized territory all or any of the powers and rights conferred by this Act upon an Inspector appointed under section 11."

(3.) "Every person authorized under paragraph (*d*) of subsection (2) shall be subject to the control and direction of the Provincial Board of Health."

(4.) All regulations to have the same force and effect as if incorporated in this Act. (Abbreviated form.)

Sec. 30. The Minister may prescribe forms. (Abbreviated form.)

Sec. 31. Salaries of Provincial Inspectors and expenses, etc., to be paid out of Consolidated Revenue Fund. (Abbreviated form.)

Sec. 32. Repeals "Milk Act," chapter 159, "Revised Statutes of British Columbia, 1924." (Abbreviated form.)

Sec. 33. Act comes into force September 1st, 1927. (Abbreviated form.)

77. REGULATIONS UNDER "MILK ACT" (ABBREVIATED FORM).

Passed pursuant to section 29, chapter 42, Statutes of British Columbia, 1926–27, and under the authority of Order in Council 882, dated August 31st, 1927.

For the purpose of classification of dairy-farms by the Provincial Inspector, and as a basis for the allotment of marks by him for the condition of dairy-farms pursuant to the Act, a standard is prescribed for stables and milk-houses on a dairy-farm and for the equipment and utensils there; provision is made for ventilation, air-space, window area, material used in construction, mangers, gutters, stabling in general, and drainage; the question of pure water and the cleanliness of milkers and workers around the barn, the carrying-out of manure, and the keeping of manure and litter, and provision against vermin and flies; also with regard to the care of utensils; milk-wagons and other vehicles used in transporting milk shall be kept clean at all times, and suitable provision shall be made for the protection of milk against mist, rain, and the direct rays of the sun.

78. REGULATIONS UNDER "MILK ACT" (ABBREVIATED FORM).

Passed pursuant to section 29, chapter 42, Statutes of British Columbia, 1926–27, by authority of Order in Council No. 314, approved April 4th, 1928.

This set of regulations is devoted entirely to classes of milk.

Regulation 1. Contains definitions of terms used.

Regulation 2. Subsections (11) to (38) set out the requirements governing the production of "certified" milk or cream. (Abbreviated form.)

Regulation 3. The following four classes of milk and cream are prescribed:—

Certified Milk and Certified Cream.—Being milk or cream, as the case may be, which complies in all respects with the standard for certified milk or cream, respectively, prescribed as above for the purposes of section 16 of the Act. (Abbreviated form.)

Preferred Raw Milk and Preferred Raw Cream.—"Being milk or cream, as the case may be, which is produced on a dairy-farm certified by a Provincial Inspector to be classed as Grade A under the Act, and which is bottled on the dairy-farm where produced, and which at no time prior to its delivery to a consumer, nor at the time of such delivery, contains, in the case of milk, more than thirty thousand bacteria (colonies) per cubic centimetre, or, in the case of cream, more than two hundred thousand bacteria (colonies) per cubic centimetre."

The Commission has made a recommendation (No. 26) to the effect that the class known as "raw milk and raw cream" be abolished. In recommending the retention of three classes (certified, preferred raw, and pasteurized) of the four now permitted and the elimination of one (raw milk and raw cream), the Commission is actuated by the following considerations:—

(*a.*) The dangers of raw milk have been fully established by the evidence taken at public hearings, in the scientific and public-health literature to-day, consulted by the Commission, and in the every-day experience of Medical Health Officers everywhere.

(*b.*) While these dangers are so great that the public health and medical opinion of to-day is strongly in the direction of the compulsory pasteurization of all milks, even of certified milks, and others prepared with great attention to the securing of safety as well as quality, the Commission is not as yet prepared to recommend that this step, however desirable, be made compulsory in this area. The proportion of certified milk and other pure raw milk consumed in the City of Vancouver is well under 5 per cent. of the total milk therein supplied and the dangers involved in such raw milk, therefore, are initially, at least, confined to a correspondingly small proportion of the population.

But while acknowledging that in the case of certified milk and preferred raw milk the safeguards thrown about them are of a high order, and, together with their small proportion of consumption, minimize the dangers involved, this cannot be said of the class designated as "raw milk and raw cream." There would appear to be no reason whatever why this class, condemned by health authorities and presenting no advantages, even fanciful advantages, over pasteurized milk, should be permitted. Under this head may easily be admitted to the milk-supplies of municipalities milk in considerable quantities which may prove to be dangerous to the health of the consumers. The milk now classed under this head is not better when received raw in the city for distribution raw than some of that raw milk which similarly is received to be pasteurized. In order that all should be equally safe, pasteurization is required. Under the recommendation of the Commission this would be accomplished.

It should be borne in mind that the above remarks refer to the class known as RAW MILK AND RAW CREAM, as set out in the regulations under the "Milk Act," and have no reference to the class known as PREFERRED RAW MILK AND PREFERRED RAW CREAM.

79. PASTEURIZED MILK AND PASTEURIZED CREAM.

Being milk or cream, as the case may be, which has been subjected to the process of pasteurization according to section 17 of the Act, and which, in the case of milk, has not at any time prior to its pasteurization contained more than 1,500,000 bacteria (colonies) per cubic centimetre, and which at no time after pasteurization and prior to its delivery contains more than 50,000 bacteria (colonies) per cubic centimetre, and which, in the case of cream, at no time after pasteurization and prior to its delivery to a consumer, nor at the time of such delivery, contains more than 150,000 bacteria (colonies) per cubic centimetre.

In recommending that the bacterial count permitted in milk intended for pasteurization be 1,500,000 for the first year, after the passage of the "Milk Act" in revised form, 1,000,000 for the second year, and 500,000 for the third and any subsequent year, the Commission is influenced by the following considerations:—

First: That while the existing requirements of 1,500,000 is so lenient as to give little assurance of a high quality in the milk, and while a requirement of 500,000 is itself an exceedingly liberal allowance in view of the standards of modern milk-supplies as generally recognized in modern communities, yet, since the existing standard of 1,500,000 has been already set, and sudden departure therefrom might, conceivably, work hardship to the producer in some cases, it seems better to develop slowly and equitably towards the desired standard than by a sudden and perhaps disconcerting jump.

Second: That while high bacterial counts in milk which is to be used raw seriously affect the estimations of both its safety and its quality, especially of its keeping quality, yet, when high counts are found in milk to be pasteurized, such counts indicate only the quality of the milk (irrespective of keeping well). Were safety alone involved, the Commission would be compelled to recommend the step from 1,500,000 to 500,000, or even lower, at once. But since the question of safety is taken care of by the pasteurization required, it is believed that the remaining problem of securing a superior keeping quality may well be allowed to work itself out more slowly, rather than that dislocation of the milk trade be risked.

Third: The Commission fully recognizes the fallacies existing in the idea that milk for pasteurization may be of lower quality than other milk intended to be used raw, or that pasteurization in some way gives an improved quality to milk otherwise poor. *The Commission concurs in the opinion of milk experts that only the highest quality of milk should be submitted*

for pasteurization, and that pasteurization should be employed merely to make such milk safe; not at all in the attempt to improve the quality of an otherwise poor milk.

80. DAIRY-FARM SCORE-CARD ("MILK ACT," CHAP. 42, 1926–27, REG. 3).

Provides total score of 80 marks under the head of equipment:—

(*a.*) Health of the cows:
(*b.*) Location, construction, provision for light, and ventilation of stables:
(*c.*) Construction and condition of utensils:
(*d.*) Location, construction, and drainage of milk-house or milk-room;

and total score of 120 marks under the head of *methods:*—

(*a.*) Cleanliness of cows:
(*b.*) Cleanliness of stables:
(*c.*) Cleanliness of milking:
(*d.*) Cleanliness of milk-room or milk-house:
(*e.*) Care and cleanliness of utensils:
(*f.*) Handling of milk or cream.

81. "HEALTH ACT," CHAP. 102, R.S.B.C. 1924 (ABBREVIATED).

Sec. 3. The Lieutenant-Governor in Council shall be the Provincial Board of Health under the provisions of this Act.

Sec. 7 (abbreviated form). The Provincial Board may make and issue such general rules, orders, and regulations as the Provincial Board deems necessary for the prevention, treatment, mitigation, and suppression of disease, and may from time to time alter or repeal any such rules, orders, and regulations, and substitute new rules, orders, and regulations; and the Provincial Board may by the rules, orders, and regulations provide for and regulate:—

(23.) The prohibition of the use or sale of milk from cows suffering from tuberculosis, and of the use, sale, or exposure for sale of the flesh of animals affected by that disease.

(29.) Generally all such matters, acts, and things that may be necessary for the protection of the public health and for ensuring the full and complete enforcement of every provision of this Act.

Sec. 30. The Council of every city and municipality in the Province shall appoint a duly qualified medical practitioner to be Medical Health Officer of the municipality, who shall perform the duties provided for in this Act, in addition to the duties imposed upon the Medical Health Officer under the provisions of the "Municipal Act" and any regulations or by-laws passed in pursuance thereof.

Sec. 31. Where the Provincial Board considers the appointment of a Medical Health Officer necessary for any township or district or municipality, and requests the Council of any such municipality to appoint a Medical Health Officer, the Council shall forthwith appoint a duly qualified medical practitioner to be Medical Health Officer for the municipality.

Sec. 36. Where a Medical Health Officer is appointed, he shall be the chief Health and Sanitary official for the municipality or union of municipalities to which he is appointed, and shall possess all the powers and authority possessed by any Health Officer or Sanitary Inspector under this Act (duties, etc.).

Sec. 37. Where the Provincial Board deems it advisable that a Medical Health Officer should be appointed for any health district, it may appoint a Medical Health Officer for the health district (powers and duties, etc.).

Sec. 40. There shall be a Local Board of Health in each municipality, which shall consist of the Council for the municipality.

Sec. 41. In unorganized territory it shall be lawful for the Lieutenant-Governor in Council from time to time to mark out and define certain portions thereof to be health districts, and to vary the same as may seem meet, and to make orders, rules, regulations for such districts, etc.

Sec. 42. In unorganized territory, when no Local Board has been established or exists, and until otherwise provided for by virtue of the provisions of this Act or by the Lieutenant-Governor in Council, the Government Agent shall, within the district of which he is in charge for the time being, have and exercise the powers and duties of a Local Board, and shall be deemed to be a Local Board of Health; and in all places and localities where there is no Government Agent in charge, the like powers and duties shall devolve upon the Superintendent of Provincial Police, who shall be deemed to be a Local Board of Health for such last-mentioned places and localities.

Sec. 43. As soon as any portion of the Province is organized into a municipality, or is included in or annexed to a municipality, the provisions of the last two preceding sections shall cease to apply.

Sec. 45. Medical Health Officers may be required by the Provincial Board, with the consent of the Local Board, to act in unorganized territory adjoining the municipality.

Sec. 46. Two or more Municipal Councils may, by concurrent by-laws, unite their respective municipalities into one district, to be called a "union," and organize and maintain a Union Board of Health (power to withdraw, etc.).

Sec. 47. Union Board to have same power and duties as a Local Board.

Sec. 56. The Provincial Board shall have power to adopt, and enforce through the Local Boards, such regulations regarding the source of supply, quality, purity, place of storage, and mode of sale of all milk procured, imported, or stored for sale or consumption within the Province as are in its opinion best adapted to secure the purity of the milk and prevent injury to the public health. The powers and duties of each Local Board in the enforcement of such regulations shall extend to the supervision of all milk-supplies, whether obtained within or without the limits of the municipality where the milk is intended for use within the municipality in which the Local Board has jurisdiction.

Sec. 59. (1.) Gives power to any member of the Provincial Board or of any Local Board, and any Medical Health Officer or Sanitary Inspector, to inspect and examine food-supplies (including milk) exposed for sale and for the destruction of unsound or unwholesome food-supplies (including milk).

(2.) Persons exposing for sale unsound food-supplies liable to a fine not exceeding $100, or imprisonment for a term of not more than three months.

Sec. 65. The Health Officer may enter and examine any premises in the place for which they hold office.

Sec. 68. Provides for examination of state of health of persons by medical practitioners under authority as Health Officers.

Sec. 110. Provides penalty for preventing or obstructing inspection of food-supplies (including milk) by proper authority, not exceeding $50, and in default a term not exceeding two months.

32. A UNION BOARD OF HEALTH.

Two or more neighbouring municipalities are authorized by Provincial Statute ("Health Act," chapter 102, R.S.B.C. 1924, sections 46, 47) to unite for the purpose of securing and maintaining a Union Board of Health common to both. The intention of the Act is to provide a legal means by which two or more municipalities, each incapable alone of bearing the expense of a well-equipped and efficient health service, may join forces and thus achieve it for both.

Where neighbouring municipalities merge into each other, one side of a street being in one municipality, the other side of the street being in the other, it may easily happen that people actual neighbours across the street are under quite different health regulations; and whether the regulations be the same or not, under quite different degrees of efficiency in the enforcement of such regulations as exist.

This, of course, works out to the detriment of both localities, the one neglecting its own development and trusting to the other for protection, the other carrying the burden for both, while hampered by the laxity of the first. Economy, efficiency, and progress in health matters are difficult to secure under such conditions.

All these points are well illustrated in the general vicinity of Vancouver proper. In the matter of milk inspection as shown elsewhere from the evidence, the municipalities of West Vancouver, North Vancouver, Burnaby, Point Grey, South Vancouver, have in the past relied on Vancouver and its efficient milk inspection for the protection of their milk-supplies, or, rather, of such portions of them as were delivered from points in Vancouver, and, therefore, from points under Vancouver Health Department control.

But in each of these municipalities milk produced locally fails of Vancouver control, and having little or no local control (except in Burnaby and, to a smaller extent, in South Vancouver), these municipalities, as far as their local milk is concerned, are practically unprotected.

Moreover, such unprotected milk is sold in the municipality where it is produced, and sometimes in neighbouring municipalities, in the same markets as the competing milk which has

had to undergo safety and quality inspections, live up to safety and quality tests, and be handled only under strict safety and quality regulations.

Since these various municipalities, while legally separate, are physically, commercially, and socially the same, it is obviously very desirable that the same health-control should be uniformly exercised over the whole area. This is particularly true with regard to water-supplies and sewage-disposal; and thus has been recognized by the establishment of the Metropolitan Water Board.

The Commissioners, in accordance with the evidence of Medical Health Officers and other officers of these districts, suggest that the necessary steps be taken for the establishment of a Union Board of Health to secure similar uniform control of milk-supplies throughout the whole of the metropolitan area, as has already been done in the case of water.

83. MUNICIPAL SYSTEM OF HANDLING MILK.

In connection with the systems followed in handling the milk question in the cities and municipalities surrounding the City of Vancouver, the evidence adduced before the Commission (dealing with the municipalities in the order in which their representatives appeared) established the following outstanding facts:—

(1.) *New Westminster.*—A certified copy of the "Milk Regulations of the City of New Westminster," which was filed with the Commission as Exhibit No. 10 and is contained on one sheet of paper, is very meagre in its scope. These regulations deal almost entirely with the subject of adulteration. The only reference therein to the bacterial count in the milk is a provision that "the term 'adulterated milk,' when so used in this code, means milk which contains an excessive number of bacteria." It is apparent, therefore, that no steps have been taken to take advantage of the provisions of the "Milk Act," chapter 42, Statutes of British Columbia, 1926-27, and particularly section 10 thereof, under which the Council of each municipality is authorized to pass by-laws for regulating the supplying of milk for human consumption within the municipality. However, the evidence did establish that both the tests for butter-fat in the milk and bacteriological tests are made by the Health Inspector as often as his time permits.

It was admitted: (*a*) That there is no restriction by which the consumers are required to be informed as to the grade of milk they are buying; (*b*) that the caps on distributers' bottles other than those used by the Fraser Valley Milk Producers' Association gave the name of the dairy only and there was nothing to indicate the percentage of butter-fat; (*c*) that there is no specific inspection of cattle outside the city's inspection of milk coming into the city; (*d*) that it is possible for distributers to buy milk from the Fraser Valley Milk Producers' Association and put any caps they like on the bottle; (*e*) that restaurants operating in the city are supplied in cans—that there is no indication of the source of the supply—that a sample is seldom taken from a restaurant, and when one is taken only the butter-fat test is applied; (*f*) finally, the Health Inspector admitted that he did not know the source from which milk comes into the city, and that they should really go out and inspect where the milk comes from, but in order to do so more help would be required.

(2.) *West Vancouver.*—West Vancouver Municipality has a by-law to regulate the licensing of milk-vendors, which by-law came into effect on May 28th, 1917 (marked Exhibit No. 12), and has also a by-law to regulate the sale of milk, which came into effect on March 27th, 1916 (marked Exhibit No. 13).

These by-laws are fairly comprehensive, and if enforced would give a reasonable measure of protection; but here again advantage has, apparently, not been taken of the latest provisions of the "Milk Act" for regulating the supplying of milk for human consumption within the municipality. It should be borne in mind that according to the evidence there are no producers in West Vancouver, and that there are only two firms distributing there.

The Medical Health Officer, who is a part-time official, stated that his general duties are just to watch the health of the community; that he had never had instructions to take milk tests and to report to the Council, and no such reports are made; that he has never made any inspections of milk, and that if he wanted a test made he would have to refer it to the Analyst of the City of Vancouver; and, finally, that milk has not been inspected at all in West Vancouver.

(3.) *North Vancouver City.*—In North Vancouver City the outstanding feature is the fact that there is no by-law, either local or under section 10 of the "Milk Act," for the regulation of the supplying of milk for human consumption within the municipality. The only tests made of the milk distributed in the city are conducted by the Vancouver City Analyst, but these do not include any tests for bacteria, there having been no bacteriological analysis made during the last ten years. The only written reports that go to the Council in connection with the milk-supply are those signed by the Vancouver City Analyst.

It was admitted before the Commission that no record is kept of the source of supply of the milk. The local dairies sell their milk in the natural state, all in bottles, and there is no indication on the caps of bottles as to how much butter-fat is contained in the milk, and the distributer could put any brand he liked on the top. The Medical Health Officer, who is a part-time official, stated that he sees that everything is in a clean and sanitary condition in so far as the care of the milk after it is taken from the cow is concerned, and also that the bottling is done under clean conditions.

(4.) *Burnaby.*—Burnaby Municipality has a good set of regulations (*see* By-law No. 509, designated as "A By-law for the Preservation of Public Health," marked Exhibit No. 15, and By-law No. 400, which is designated as a "By-law respecting the Sale of Milk within the Municipality of Burnaby," marked Exhibit No. 16), and the Medical Health Officer, who is conceded to be an expert health official, is a full-time officer and is giving excellent service.

Bacteriological tests are made under the direction of the Health Department by special arrangement with the laboratory at the General Hospital. Two samples are taken every week, and that is all that can be taken care of because of the limited accommodation of the laboratory of the General Hospital. In this connection it was pointed out that in Burnaby, in common with all the communities around, they depend very largely upon the protection provided by the Medical Health Officer of Vancouver, Dr. Underhill. It was stated that being under the care of the Vancouver authorities is the best that could be obtained under circumstances and conditions as they exist. It is just a matter of spending money necessary to provide the requisite equipment to handle sufficient tests.

This witness admitted that very few butter-fat tests were made in Burnaby, and there are no restrictions within the municipality to inform the consumer with regard to what kind of milk he gets.

In conclusion, this witness contended that the question of a good milk-supply is a matter of inspection and keeping producers and distributers up to the required standard. With regard to inspection, he contended that it should be all under one Metropolitan Health Board, with one department looking after it.

(5.) *Richmond Municipality.*—Richmond is another municipality where there is no by-law, either local or under section 10 of the "Milk Act," for regulating the supply of milk for human consumption within the municipality. The following is an excerpt from a letter dated July 6th, 1928, addressed to the Commission, and signed by the Clerk of the municipality, namely:—

"In the matter of rules and regulations covering milk-supplies and dairies situated in the Municipality of Richmond, I might say they are governed entirely under the Provincial Government Milk Inspection Act and we have no local by-laws dealing with same."

The Medical Health Officer, who is a part-time official, stated in his evidence that he had not any instructions pertaining to milk, and that he did not make any inspections of milk at all—that is, in a general way, such as taking samples of milk, and so forth. He stated further that, notwithstanding the fact that all local milk is sold raw, the only bacterial tests made were those made by the City of Vancouver. These would, of course, only act as a safeguard in connection with the portion of the milk which comes into the City of Vancouver and would afford little protection to the portion consumed within the Municipality of Richmond.

(6.) *Point Grey Municipality.*—Point Grey Municipality has a by-law relating to milk and cream kept or exposed for sale, a certified copy of which was filed with the Commission, and marked Exhibit No. 20. So far as the evidence given before the Commission is concerned, the by-law appears in certain respects to have been observed more in the breach than in the enforcement. For example, Regulation 83 of the above by-law provides for the appointment of a Dairy Inspector by the Medical Health Officer, but there is no evidence to show that this was ever done. Regulation 95 provides that any person importing milk to sell within the municipality must first obtain a certificate from a duly qualified veterinary surgeon stating that every cow

on the farm or farms from which such milk is obtained is free from tuberculosis. This regulation, so far as any evidence before us goes, has not been carried out. Regulation 121 provides that the Medical Health Officer is to inspect dairies and vehicles. There is no evidence to show that this is being done. The Medical Health Officer, who is a part-time official, was unable to appear before the Commission, but a representative appeared on his behalf, and, amongst other things, stated that the milk-supply of Point Grey is considered as one with that of the city, and beyond looking into any complaints—individual complaints made—nothing has been done there for years past. In fact, little has been done in the nature of systematic examinations, or taking samples of milk, because it has been felt that the municipality is amply protected by the city. The witness admitted that the fact that the city has preventive measures would not afford any protection with respect to raw milk coming into the municipality from other sources, and the information in the hands of the Commission shows that there is a considerable quantity of such milk delivered and consumed therein.

(7.) *South Vancouver Municipality.*—This municipality has a by-law respecting the production and sale of milk for human consumption (*see* Exhibit No. 21). Also a further by-law covering the keeping of cows and goats and stable requirements for the same (*see* Exhibit No. 24). The Milk Inspector appeared before the Commission and stated that he is a full-time man, having full control over stables and the production of milk. The witness admitted that the by-laws above referred to were based a good deal on the preceding "Milk Act," and that the same had not been amended to comply with the amended Act of 1926–27.

It is to be noted that while Regulation 44 of above by-law (Exhibit No. 21) provides that bacteriological tests shall be made, it was admitted before the Commission that no such tests have been made, the chief reliance being placed on the butter-fat test. It was also stated that, roughly, one-quarter of the total milk-supply comes from the local producers, small cow-keepers, and that it is sold in the raw state. With regard to the caps on the bottles, the by-law requires the dairies to put their name on the cap, but this regulation is not enforced against individuals, in order to save them the expense of so doing.

Subject to the above, and also to the fact that the Inspector apparently is pressed for time, owing to his many other duties, the handling of the milk-supply in South Vancouver is being fairly well attended to.

City of Vancouver.—(As up to the end of 1928.) The evidence before the Commission relating to the official supervision of milk was particularly full and indicated a very comprehensive and detailed control service; a complete set of regulations; inspections covering all details required by the regulations; both chemical and bacteriological analyses; and a continuous operation of all these, with proper enforcement on occasion. Testimony from neighbouring municipalities showed that most of them relied upon the City of Vancouver for much of the work necessary to proper milk supervision—entirely so with regard to milk distributed from Vancouver, and in part at least with regard to milk produced elsewhere; i.e., to the extent that analytical work required was obtained by reference to the Vancouver City Laboratory, New Westminster being the only exception in this regard.

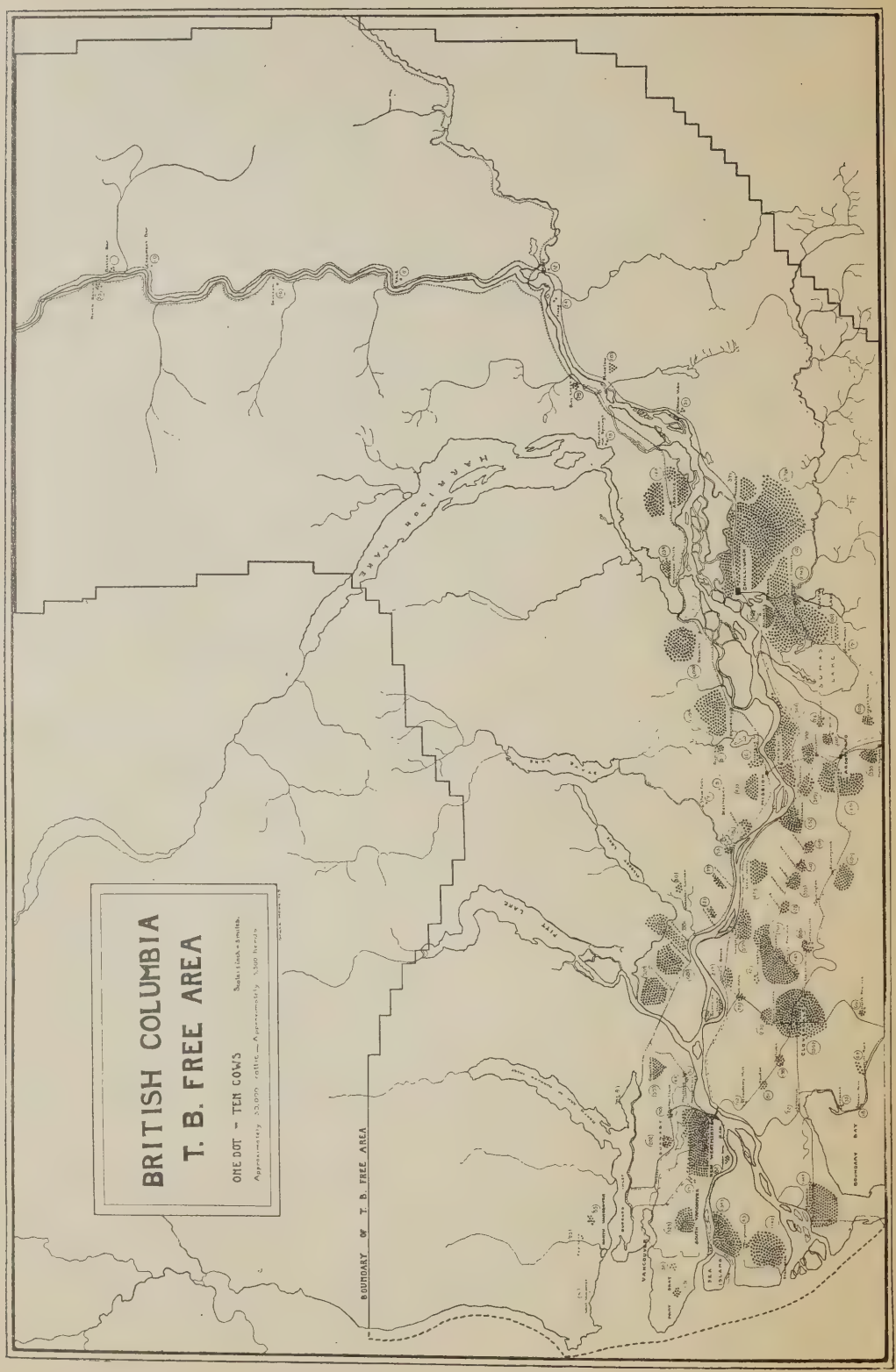
In spite of the above commendation, however, it is only truthful to add that, excellent as is the organization and the work actually done, the former is inadequate, and the latter consequently insufficiently extensive, to secure the full and complete benefit to the city which would accrue were the Health Department not undermanned.

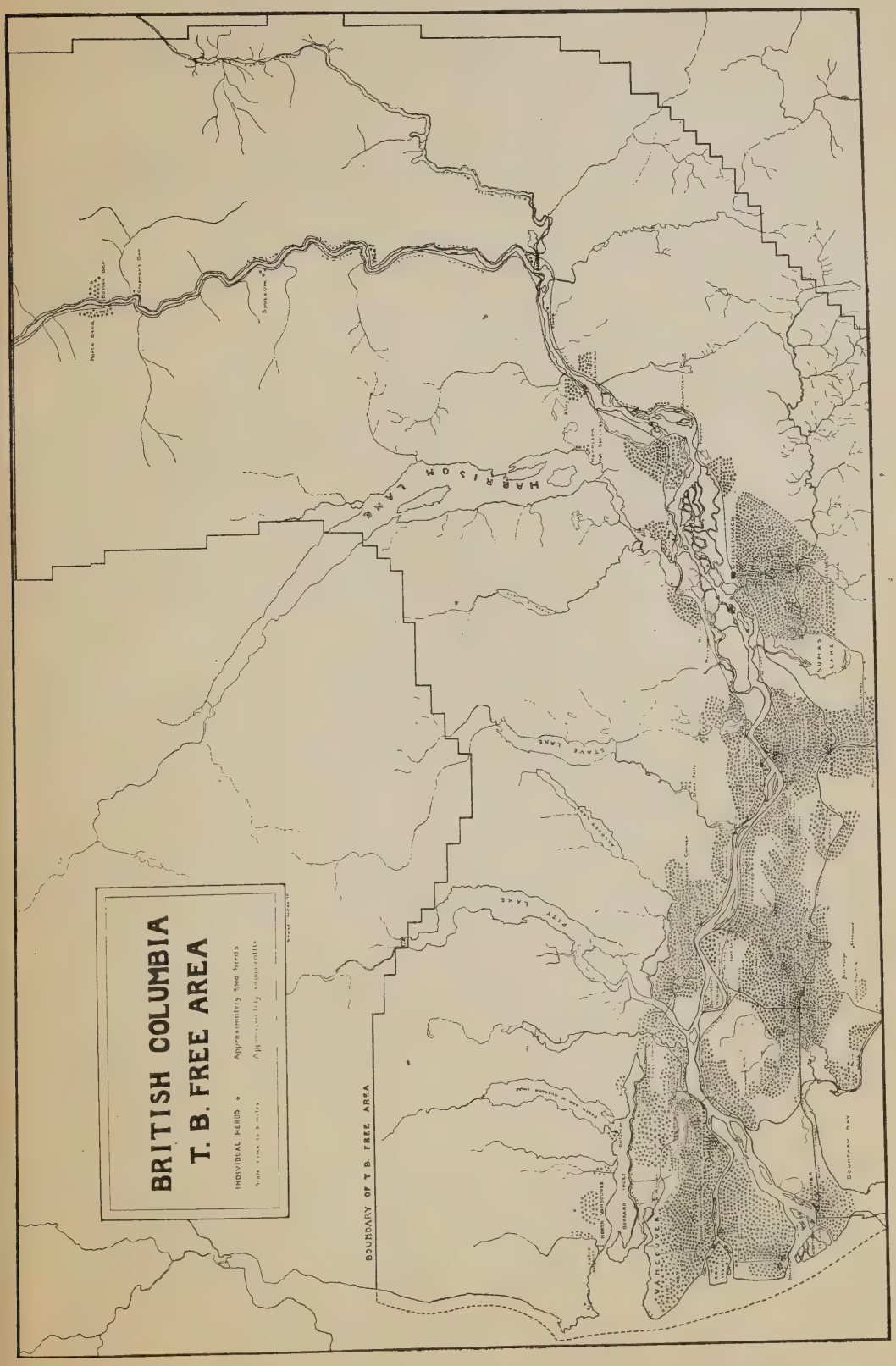
In commending the present work of the Vancouver Health Department, the Commission urges its extension within the old City of Vancouver, as well as in the new territory, South Vancouver and Point Grey, which became part of Vancouver on January 1st, 1929.

This is by no means a mere formal commendation or recommendation, but an integral part of the plan which the Commission recommends for the good of the milk industry of this vicinity.

84. THE T.B. FREE AREA.

Two maps dealing with the T.B. Free area are included. The map dealing with the individual herds shows a large number in and around Vancouver. These are largely one-cow herds. The map dealing with numbers of cows (all ages) shows one dot for each ten animals, and, as is to be expected, the dots decrease materially as compared to the first map. A glance at the map which shows the cow population should quickly record in the mind of even the casual observer the places and centres from which Vancouver may expect to draw her milk-supply. The large herds and, as indicated elsewhere, the largest potential supply of milk of good quality


BRITISH COLUMBIA
T. B. FREE AREA
ONE DOT = TEN COWS
BOUNDARY OF T. B. FREE AREA
PEACE RIVER
FRASER RIVER
VANCOUVER
VICTORIA
BOUNDARY BAY


BRITISH COLUMBIA
T. B. FREE AREA
INDIVIDUAL HERDS
BOUNDARY OF T. B. FREE AREA
HARRISON LAKE
STUART LAKE
BABINE LAKE
SUMAS LAKE
VANCOUVER
BOUNDARY BAY

is found in the Chilliwack Valley, Agassiz, Dewdney, Cloverdale, and other centres of some importance. New Westminster District is strikingly important, but all the important centres of milk-supply are not and cannot be expected to be in close proximity to the city. (*See* maps entitled "British Columbia T.B. Free Area"; "Individual Herds and British Columbia T.B. Free Area." 1 dot=10 cows.)

85. REGULATIONS RELATING TO THE ESTABLISHMENT AND MAINTENANCE OF RESTRICTED AREAS FOR THE ERADICATION OF BOVINE TUBERCULOSIS.

By Order in Council dated May 4th, 1927, in virtue of the "Animal Contagious Diseases Act," R.S.C. 1906.

The following regulations set out the procedure to be followed in order that a district might come under the "Restricted Area Plan" and what must be done in order to maintain the area, namely:—

1. Upon receipt of a request from the Government of any Province, and upon compliance with the provisions of these regulations, the Government of Canada will, wherever it appears desirable to the Minister of Agriculture so to do, assist in the eradication of bovine tuberculosis from a restricted area in the manner hereinafter provided.

2. Applications may be made to the Dominion Department of Agriculture by the Minister of Agriculture of the Provincial Government, stating that the Province is desirous of Federal aid in the eradication of bovine tuberculosis from a restricted area, upon and subject to the provisions of these regulations, and stating: (*a*) The location and boundaries of the proposed area; (*b*) the approximate number of cattle within it; (*c*) that a majority consisting of at least two-thirds of the cattle-owners in the proposed area are in favour of having their cattle tested for the eradication of tuberculosis; and (*d*) that the Provincial Government, whenever requested by the Federal Government Department of Agriculture, will assist in the enforcement of these regulations by conducting prosecutions of persons accused of obstructing or refusing to assist Federal Inspectors engaged in the work of testing cattle and persons who in any way refuse to obey the regulations made hereunder.

3. Upon the approval of the Minister of Agriculture of any such application, a proclamation may be published in the Canada Gazette constituting the proposed area a restricted area within the meaning of these regulations, whereupon all provisions of these regulations shall apply to said restricted area.

4. The said area shall be a quarantined area in so far as bovine tuberculosis is concerned. Cattle may only be moved into or out of the area under the following conditions:—

(*a.*) Fully accredited cattle accompanied by a certificate of a Veterinary Inspector may enter the area without test.

(*b.*) Cattle from herds under the supervision of the Health of Animals Branch for the Eradication of Tuberculosis may enter the area without test if accompanied by a certificate signed by a Veterinary Inspector showing the date of the last test.

(*c.*) Other cattle intended to remain within the area shall be subjected to the tuberculin test by a Veterinary Inspector or approved veterinarian before admittance to the area.

(*d.*) Cattle for entry into the area for exhibition purposes or other temporary stay, not covered by sections (*a*) and (*b*), shall be subjected to the tuberculin test by a Veterinary Inspector or approved veterinarian before admittance to the area.

(*e.*) Cattle for immediate slaughter consigned to approved slaughter-houses only may be brought into the area without test, but shall not be allowed to come in contact with other cattle and shall be kept isolated on the premises until slaughtered.

(*f.*) Cattle in transit across the area by rail shall not be unloaded except at a point designated for that purpose where they may be kept from contact with other cattle within the area.

(*g.*) Cattle shall not be driven across the area by road unless special permission has been obtained in writing from the Veterinary Inspector in charge of the area.

5. Owners of cattle within the area will be required to assist the Veterinary Inspectors making the test by assembling the cattle when requested, and giving whatever additional help as may be reasonably expected. Owners when requested must furnish meals and bed for the Inspector while conducting the test.

6. Suitable transportation from farm to farm within the area for the officers of the Health of Animals Branch must be provided by the Provincial Government.

7. Use of syndicate or joint bulls will be permitted in herds that are equally free from disease, but not otherwise. For instance, a bull from a herd that has contained reactors shall not be used in a herd that has passed a clean test.

8. All cattle within the area shall be submitted to the tuberculin test as soon as practicable by Veterinary Inspectors or accredited veterinarians, and shall be retested whenever deemed necessary by the Veterinary Director-General.

9. Reactors to the test shall be marked for identification and shall be disposed of by slaughter under inspection forthwith.

10. Compensation for reactors slaughtered by order of a Veterinary Inspector duly authorized under the Act may be granted as provided in sections 6 and 7 of the "Animal Contagious Diseases Act."

11. Compensation will not be paid for reacting grade bulls, steers, or animals affected with lumpy jaw.

12. The feeding of animals within a restricted area on by-products of cheese-factories, skimming-stations, and butter-factories is prohibited, unless the said by-products have first been sterilized by heat.

Evidence on this subject was given before the Commission by Dr. W. H. McKenzie, a veterinary surgeon in the employ of the Federal Department of Agriculture.

The object in establishing these areas is for the purpose of eradicating bovine tuberculosis. All cattle in the area are tested and no cattle are allowed to enter the area except tested cattle, other than cattle shipped in for immediate slaughter at approved abattoirs or slaughter-houses. Provision also is made for shipments of cattle in transit across the area, and these cattle must be unloaded at yards set aside exclusively for their accommodation.

This area, known as the "Fraser Valley Restricted Area," was established on February 15th, 1926, and is the only similar area in British Columbia. The original legal description of the area is outlined in the Canada Gazette dated March 6th, 1926, at page 2478. With some slight changes made at the northern boundary, this description still obtains.

Under the restricted area plan, retests are conducted whenever deemed necessary by the Veterinary Director-General.

The first general test was made in 1926, when 5,532 herds, comprising 46,734 cattle, were tested. The number of infected premises was 1,184, the number of reactors 3,650, and the compensation awarded at that test was $122,920.85; 7.8 per cent. of the animals reacted to the test and were sold for slaughter.

At the first retest in 1926—that is, dealing with herds where infection was found at the first test—1,360 herds, comprising 17,942 cattle, were tested. The number of infected premises was 331, the number of reactors 713, and the compensation awarded was $27,667. The percentage of reactors in that case was 3.9 per cent. These animals were sold for slaughter.

At the second retest in the same year the number of herds was 327; the number of cattle, 5,426; the number of infected premises, 38; the number of reactors, 57; the compensation, $2,145.32. The percentage of reactors was 1.

The second general test was commenced in March, 1927. At this test 5,471 herds, comprising 46,422 cattle, were dealt with. The number of infected premises was 318, the number of reactors 511, and the compensation awarded was $20,612.70. The percentage of reactors was 1.1.

In the evidence given before the Commission the figures in connection with the retests made during 1927 were totalled as follows: 457 herds, 7,420 cattle, 65 infected premises, 129 reactors; compensation, $5,123.46.

The intention is to make a third general test in the fall of 1928.

In herds where reactors were uncovered in the first test the tests were continued at suitable intervals until the herds were clean. In the case of clean herds the second test was made one year after the first. Whenever reactors are found they are isolated immediately, and are put under quarantine and the owner is not permitted to dispose of the milk from reacting cattle.

As will be gathered from the foregoing, when a reactor is taken away the farmer is *compensated.* The Act ("Animal and Contagious Diseases Act") provides in the case of pure-bred cattle that the maximum valuation which can be placed is $150, and the compensation allowed is

two-thirds of the valuation. In the case of grade cattle the maximum valuation is $60 and the farmer receives compensation amounting to two-thirds of the value. The valuation is placed on the animal by the Inspector who makes the test. There is no fixed valuation within the limits above referred to, but for an owner to receive the maximum the animal would have to be an exceptionally fine one. All the Department contemplates doing is to assist an owner to bear his loss. It does not contemplate paying him the full value of the animal. As far as salvage goes (that is, the amount realized from the sale of the carcass), the owner gets that in addition to the compensation awarded as above.

On the question of the economic loss to the farmer, the average compensation awarded during the general test in 1926 was $33.68 and during the general test in 1927 the average was $37.64. That includes pure-bred, large and small animals, and all ages. It is difficult to estimate what percentage of the value of the animal this would be on the average throughout the area. No definite evidence was given before the Commission, but one witness suggested that it would not exceed 25 per cent. There is no question, however, that getting rid of tuberculosis will ultimately be to the farmer's advantage from an economic point of view, even though immediate costs have been heavy. At the same time it should be recognized that the area has been established and the tests made, largely in the interest of a city milk-supply that is safe.

86. DEROCHE TRANSPORTATION FACILITIES.

During the session of the Commission held at Mission on September 21st, several farmers, speaking on their own behalf as well as for about forty others who ship their milk by rail from a station known as Deroche, lodged a complaint about the regulations of the railway company. Taken from the evidence, their main objections were as follows:—

1. They are required to load their own milk, which means that, in addition to delivering the milk some minutes before train-time, they have to wait around for the train, which is sometimes late to the extent of an hour or more. This milk is handled by the train known as the "Agassiz Local," which is held for one-half hour at Nicomen, about 1 mile farther west, in order to allow a through train to pass. One of the witnesses stated that at one time, when he took the matter up with the railway company, there were 150 cans being shipped from Deroche and only six cans from Nicomen. Furthermore, they complain that there is no system for letting them know whether the train will be on time or an hour or half an hour late, and that the milk is left, consequently, sometimes standing on an open platform with no protection against sun, wind, or rain, with consequent danger to its keeping qualities.

2. This train, the Agassiz Local, used to get into Deroche at 7.55 a.m., but last spring the time of arrival was changed to 7.20 a.m., with the result that the farmers have to milk that much earlier, or about 4 a.m., in order to make connections, and in addition have not sufficient time to properly cool their milk.

The remedies which these farmers would like to have applied to meet the above situation are:—

(*a.*) To have the Agassiz Local held at Harrison Mills Station for the half-hour period above referred to.

(*b.*) To require the railway company to provide the necessary facilities for loading the milk at all stations.

The Commission was impressed with the evidence given by the farmers above referred to, and is of the opinion that they should be granted some relief. We therefore recommend to them that they make a formal request to the railway company for such relief, and in the event of failure to obtain same, that an application be made to the Board of Railway Commissioners at their next sitting in Vancouver. In order to keep down expense, we would remind these farmers that they can submit such an application themselves through their own representatives, provided they previously arrange with the Railway Commissioners for a date upon which it shall be heard.

87. CONTRACTS.

(1.) *Fraser Valley Milk Producers' Association.*—The salient features in the contract between the above association and its producers, a specimen of which was filed with the commission and marked Exhibit No. 119, are as follows:—

(*a.*) The Producer agrees to forward to the Association all his milk or cream for a continuous period from the date the contract is entered into until he shall retire absolutely from the dairy business in the lower mainland of British Columbia, subject to cancellation by a twelve-months' notice; provided always that the Producer will endeavour to follow the instructions of the Association as to the proportionate quantities of milk to be produced during the several months of the year, in order that the natural surplus in the spring may be reduced as much as possible.

(*b.*) The Producer agrees to be responsible for the condition of the said milk or cream until the same is accepted by the Association.

(*c.*) The Association agrees to receive all said milk or cream and to sell the same as may be deemed to be most advantageous to all members thereof, and to pool the proceeds and to distribute the same on the basis of the butter-fat content; provided always that the Association may deduct from month to month such amounts for the purposes of the Association not exceeding 10 per cent. as its directors may decide, and said amounts shall be a fund to be expended as follows:—

1. To provide for all losses, costs, charges, and expenses incurred by the Association in carrying on its business, together with an allowance for depreciation.

2. To establish a reserve fund.

3. For the purpose of paying a cash dividend not exceeding 8 per centum per annum on the paid-up capital stock of the Association.

4. The directors may retain from such fund, after the foregoing subsections have been complied with, such amounts as the directors may deem advisable for the purpose of purchasing any land, building, machinery, or equipment which they may deem advisable for the benefit of the Association; provided such expenditure in any year shall not exceed 2½ per cent. of the total amount realized from all sales of milk or cream during such year.

5. Any balance remaining over shall be disposed of in such manner as shall be decided in annual general meeting.

(*d.*) The Association agrees to make payment semi-monthly for all milk or cream received.

(*e.*) The Producer covenants with the Association that should he make default in the delivery of the milk or cream contracted for he will pay to the Association the sum of 20 cents for each pound of butter-fat not delivered.

(2.) *Contracts between Independents and their Producers.*—Four specimens of these agreements were filed with the Commission by dealers and marked Exhibits Nos. 66, 80, 91, and 121. An examination of these documents shows that they only vary as to minor details and agree with regard to the main principles, which are as follows:—

(*a.*) The Producer agrees to sell exclusively to the Purchaser all milk and cream produced by the said Producer.

(*b.*) The Purchaser agrees to supply the Producer with all necessary cans for shipping the said supply of milk.

(*c.*) The Producer agrees to ship at his own expense the aforesaid milk and cream to the Purchaser at Vancouver, B.C., in the aforesaid cans, properly closed and sealed.

(*d.*) The Purchaser agrees to pay the Producer for each pound of butter-fat in accordance with the terms of the contract, the concurrent rate monthly paid by the Fraser Valley Milk Producers' Association to its shippers, plus 7 cents f.o.b. Vancouver.

(*e.*) The Purchaser agrees to pay the Producer all moneys due from time to time under the contract twice a month.

(*f.*) The Producer agrees to take all proper precautions to see that the milk or cream supplied shall reach its destination in the best possible condition and suitable for market purposes.

Three of the contracts above referred to contain a provision that the agreement is made subject to all Provincial, municipal, or civic by-laws now existing or hereafter to be enacted, but the fourth one is silent on this point.

With regard to termination of these contracts, two of the documents provide for the cancellation by either party giving six months' notice in writing to that effect. The third stipulates twelve months' notice in writing, and the fourth states that it may be terminated on March 31st of any year by either party giving to the other notice in writing at least three months previous to date of termination.

(3.) *Truck-drivers' Contracts.*—Under this heading brief reference is made to the agreements entered into between various truck-drivers and the several dairies for collecting and hauling the milk from the outlying districts to the plants in Vancouver. With one exception—namely, the Fraser Valley Milk Producers' Association, who have a written contract with their drivers—the arrangement is a verbal one. The evidence given before the Commission indicates that the competition for the business is fairly keen, with the result that the work is handled on a close margin. To a man, the drivers who gave evidence stated that they were just making a living, or, to put it in another way, they are just making wages. The consideration paid them varies according to conditions and the distance covered in their routes.

88. BOTTLE LOSSES.

Bottle losses are of some importance. It is estimated that approximately 300,000 bottles are lost or broken in the course of a year's business by all dairies operating in the metropolitan area.

A rental charge of 5 cents per bottle is made by all dairies, but this amount does not always lead to the return of the bottle. Bottles cost about 9 cents each and consequently there is a loss of about 4 cents on the part of some dairy for every bottle that is not returned. Junk-dealers, in the course of their rounds, pick up many bottles from various sources and these are, in turn, offered to dairies at reduced prices. Some dairies buy these bottles. Some do not.

The Commission considers the situation to be of sufficient importance to warrant definite recommendations. (*See* recommendation 10.)

SOME ECONOMIC ASPECTS.

89. THE FARMERS' REACTION TO POST-WAR CONDITIONS.

Possibly no more comprehensive statement with regard to the British Columbia dairy industry is to be found anywhere than that published in British Columbia Department of Agriculture Bulletin No. 103 (College of Agriculture Bulletin No. 13). This bulletin is based on an economic study of 726 farms and is a summary of conditions over a period of five years. A copy can be obtained from the Department of Agriculture, Victoria, or the College of Agriculture, University of British Columbia, Vancouver. The following is an excerpt from pages 9, 10, and 11:—

"THE DAIRYMEN'S REACTION TO POST-WAR CONDITIONS.

"The business of the crop year of 1920—that is, the year preceding the five years of this analysis—was a particularly discouraging one for the dairymen of British Columbia. This was not due so much to low returns as to other factors over which they appeared to have little control. The prices of farm products were rapidly falling, while the prices of the commodities that dairymen had to buy remained at the old price-level. The farmers' purchasing-power was rapidly decreasing and the dairymen found it increasingly difficult to meet obligations. This is brought out in Fig. 1, which shows the average price of butter-fat, which was their main product, over the seven-year period. The 1921 price was 20 cents per pound lower than that which was obtained during 1920. The change in the butter-fat price was greater during that year than in any other during the period. The high war price had continued for over a year after the cessation of hostilities. Most dairymen were convinced that conditions had settled and that a new period had arrived in which continued high prices would be maintained. Because of this condition dairymen had not hestitated to enter into contracts involving expense which hazarded their future. The great reduction in their anticipated receipts, caused by such a rapid drop in prices, precipitated them into financial difficulties which had not been foreseen. Retrenchment seemed the only method whereby the budget might be balanced. The dairymen adopted this policy, but their budget has not since been balanced as satisfactorily as it was in 1919, the preliminary year of the Dairy-farm Survey.

"In order to show the farmers' reaction to conditions prevailing over the whole period, Fig. 2 is here presented. This chart shows the return on the dairy-farm operator's investment after meeting every expense, including depreciation in full, and also wages to the operator and his family for farm labour. The operator's wage was calculated at the rate of $80 per month, or $960 per year. The crop year of 1919 was the best year of the seven-year period for dairymen. During that year the business returned them an average rate of 8 per cent. on capital

investment. In 1920 the rate dropped to 3 per cent., to 0.8 per cent. in 1921, and to 0.5 per cent. in 1922. In 1923 the returns improved and yielded an average rate of return of 2.4 per cent. on capital investment. The average rate of return on investment increased again to 3.9 per cent. in 1924, but dropped once more in 1925 to 2.9 per cent.

FIG. 1. AVERAGE PRICE RECEIVED PER HUNDRED POUNDS BUTTER-FAT, 1919–25.

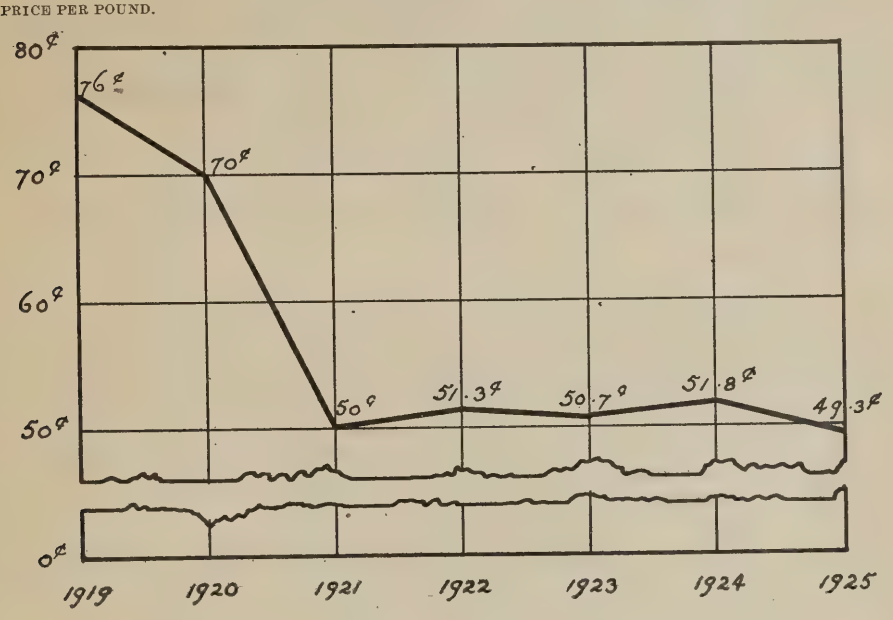


FIG. 2. RATE OF RETURN ON OPERATOR'S INVESTMENT IN DAIRY-FARMING OVER A SEVEN-YEAR PERIOD, 1919–25, AFTER MEETING EVERY EXPENSE, INCLUDING OPERATOR'S WAGES.

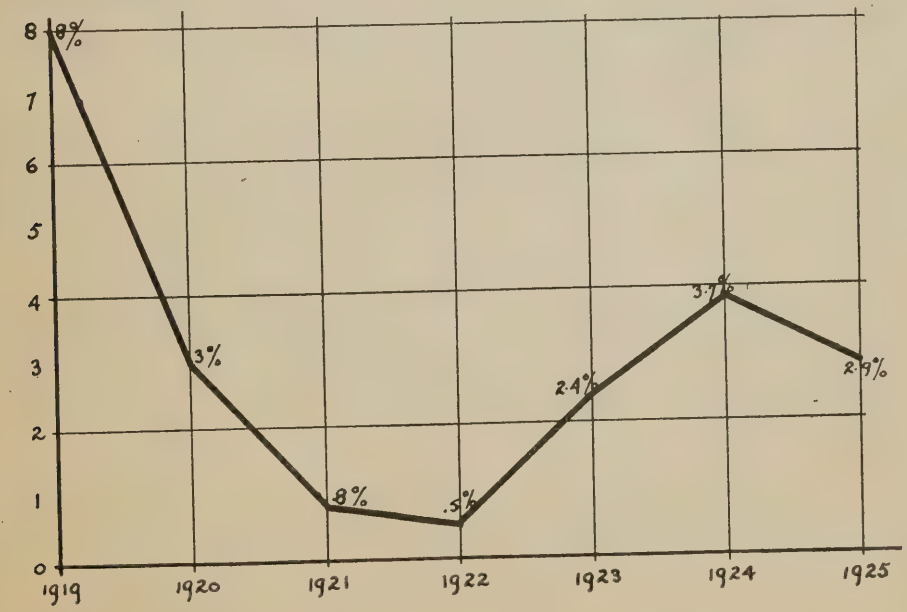
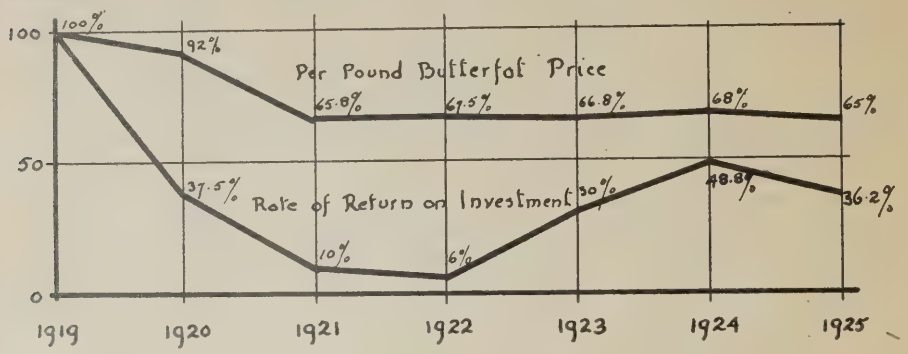


FIG. 3. COMPARISON OF THE RATE OF RETURN ON OPERATOR'S CAPITAL VALUATION AND THE PRICE OF BUTTER-FAT, BOTH EXPRESSED IN PERCENTAGE OF THE 1919 BASE, 1919–25.



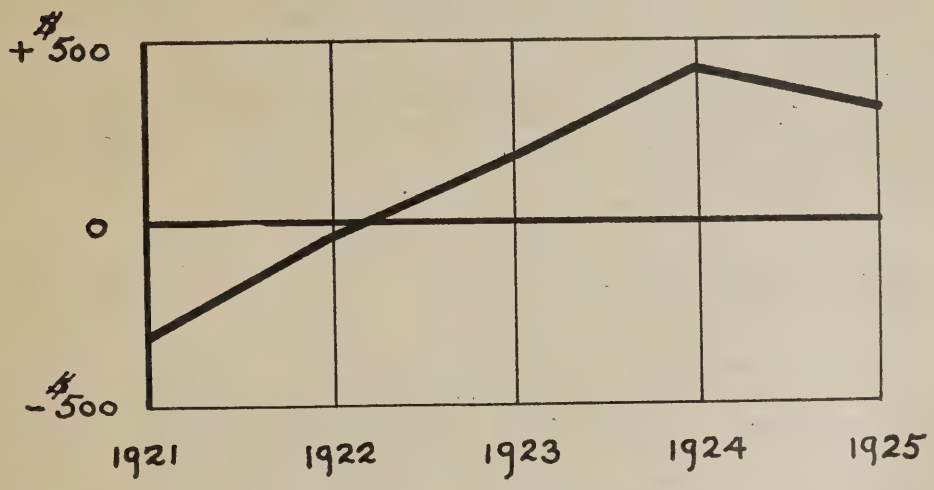
"Fig. 3 shows the relation between the butter-fat price and the return on investment over the seven-year period, both expressed on a percentage basis. In this comparison 1919 was used as the starting-point. Fig. 3 shows that in 1920 there was a drop of 8 per cent. in the butter-fat price, and a drop of 62.5 per cent. in the return on investment. During the more prosperous year of 1919, and probably during 1917 and 1918 as well, the farmers had learned to practise a certain liberality in connection with operating expense; some farmers even permitted expenses to pyramid. The reduced income due to the lower prices, along with increased expenses, created a tremendous variation between butter-fat price and return on investment in 1920. That season had taught the necessity of practising economy, so that, with a drop of 27.5 per cent. in 1921, the rate of return on investment did not continue to fall in such disastrous proportions as in the preceding year. The proportionate decrease of return on investment was reduced again in 1922. The return on investment, however, dropped again, while the prices of butter-fat, the dairymen's main commodity, went up a little. With practically no change in butter-fat prices during 1923, the dairymen increased their return on investment. Conditions had begun to improve. The dairymen had found finally that by changing their methods of management they could extract more for themselves from the business. This increase of return on investment was maintained in 1924. It was due, to some extent, as is shown in Fig. 3, to an increase of the butter-fat price. In 1925 the price dropped again and concurrently the farmers' return on investment. In 1925, as in 1920, a comparatively small drop in the butter-fat price was accompanied by a much greater percentage drop in the rate of return on investment.

"In summarizing the findings as expressed in this brief study, it would appear that one is justified in making the following statements: (1.) In the course of a certain period, even a short period of one or two years, of improving dairying conditions, as expressed by the rate of return on the operator's investment, a small percentage drop in butter-fat prices creates a much greater percentage drop in the rate of return on investment. (2.) During a period of falling prices dairymen practise a retrenchment policy in connection with operating expense which reacts to offset the drop in price. Management plans on a retrenched basis, however, are put into practice some months following the fall of butter-fat prices, thus permitting the rate of return on investment to decrease faster than prices. This annual decrease in percentage in the rate of return on investment tends to rise as soon as prices become settled. (3.) During periods of improving prices in dairy-farming, operating costs increase. This increase in operating cost tends to offset the advantages of improved conditions."

90. AVERAGE "OPERATOR INCOME" FOR EACH OF THE FIVE YEARS, 1921–25.

The following excerpt from the bulletin referred to above needs no comment:—

FIG. 4. AVERAGE OPERATOR INCOME ON FARMS OF VARYING SIZE, 1921–25.



"AVERAGE 'OPERATOR INCOME' FOR EACH OF THE FIVE YEARS, 1921–25.

"The average 'operator income' for each of the five years covered by this investigation and in each of the different groups of farms is presented in Table No. 33, Appendix. This table is summarized in Fig. 4, which shows the average 'operator income' on all farms for each of the different years. The year 1921 was the most discouraging of all when the average 'operator income' amounted to minus $303.50. The 'operator income' gradually increased during the years of 1922, 1923, and 1924, amounting to minus $44.73 in 1922, $174.25 in 1923, and $408.79 in 1924. In 1925 the average 'operator income' declined slightly to $315.20."

91. THE COST PER POUND OF PRODUCING MILK-FAT.

The following excerpt from the same bulletin referred to previously, found on pages 69, 70, and 71, sets forth the situation very well. The statement is worthy of special study:—

"THE COST PER POUND OF PRODUCING BUTTER-FAT.

"The residual method was used in this investigation in determining the cost of production of butter-fat. This method presumes that products other than milk produced on the farm returned a revenue identical with their cost of production. Such a method is accurate only in so far as the above presumption applies. The greater the percentage of the gross farm receipts derived from the sale of butter-fat, the greater the probable accuracy of the method here used. For this reason, then, this method of determining the cost of production is applied only to farms where at least 50 per cent. of the gross revenue was made up from the sale of dairy cattle and dairy-cattle products. Such a farm may be considered a specialized dairy-farm. The major interest was that of dairying. Other projects may be considered such as would be carried to utilize effort that might otherwise be wasted, and for that reason the expression of the whole results of such a business in terms of cost of production of butter-fat is at least a fair method. Inaccuracies in results by this method will be proportionate to the degree of loss or gain sustained by the side-lines of the business. The method as used may be best illustrated by the following example:—

Farm No.	126
Size	52 acres
Number of cows	12.9
Pounds of butter-fat produced	3,942
Total farm capital valuation	$17,860

Farm Expense.		*Farm Receipts.*	
Family and hired labour	$493.50	Crop-sales	$970.00
Feed bought	106.63	Egg-sales	109.00
Seed bought	53.22	Live-stock sales	219.90
Taxes	210.00	Increase of live stock	52.00
Miscellaneous farm expense	329.40	Increase of inventory of feed and supplies	35.45
Live stock purchased	63.60	Miscellaneous receipts	246.05
Depreciation on buildings and machinery	335.00		
Operator's labour	960.00	Total receipts from side-lines	$1,632.40
Cost of production of all farm products	$3,801.55		
Cost of production of all butter-fat	$2,169.15		
3,942 lb. of butter-fat cost			$2,169.15
1 lb. of butter-fat cost			.55

"In the example shown it should be noted that some items were considered as expense which may not necessarily have been paid out in cash during the year. Family labour, depreciation on buildings and machinery, and interest on total capital valuation come in this class of expense. A wage to the operator at the rate of $960 a year was also calculated as a cost item. By including in cost the above-mentioned items a farm will yield a profit providing the selling-price per unit of product exceeds the cost of production.

"In calculating the cost the business of all farms used in the survey was dealt with as one unit. There were 726 records used during the five-year period. It was found that more than 50 per cent. of the receipts in all these farm records was made up by receipts from dairy cattle and dairy-cattle products. The cost of production of butter-fat for each of the five years covered by this survey is presented in Table No. 53, Appendix. A weighted average cost of production for the five years was determined and amounted to 74.4 cents. The average price received for the butter-fat was 50.5 cents. A loss of 23.9 cents per pound was thus registered.

"From the fact that dairymen continue to produce butter-fat in increasing amounts, it would appear that items included in costs as here calculated amounted to more than was necessary to encourage production. Using the survey of 1925, it was found that the cost price very closely approximated the price received by the farmer when one omitted from the cost family labour and depreciation on buildings and machinery. In 1925 the operators of dairy-farms met the necessary payments of family labour and depreciation on buildings and machinery from their operator and interest incomes.

"One may consider that satisfactory markets for butter-fat exist in most of the dairying areas in British Columbia. There is, however, one price paid for commercial butter-fat in each district. The difficulty is that different operators of dairy-farms find it impossible to establish one cost price applicable to all farms. Each farm operator finds that his cost differs from that of his neighbour. The range in cost of butter-fat on different farms by the method here adopted varied from 20 cents to $1.75 per pound. With one selling-price prevailing some were able to produce at a profit, while others produced at a loss. Profits result when the selling-price exceeds the cost price. It is very difficult for the individual to effect changes in the selling-price. By concerted effort on the part of a large group some improvement may be produced. The great hope for dairymen, however, is not through improved selling-prices, but by a reduction in the cost of production. The encouraging factor in this regard is that the cost price is influenced by the management put into practice by individual dairymen. The management factors that appear to influence the cost of production of butter-fat to the greatest extent may be summed up as follows:—

"(1.) *The Annual Butter-fat Production per Cow.*—This factor is regulated by the inherent ability of the cow to produce, which is governed by the breeding that lies behind the individual. The cow's inherent ability can only function when the proper feed is provided in correct proportions along with the application of kind and considerate care. The minimum standard of production per mature cow should be at least 300 lb. of butter-fat per year.

"(2.) *The Yield of Crops Produced on the Farm.*—The dairyman who is content with crop yields equal only to the average of all his neighbours is very likely to be disappointed with his financial returns from the business.

"(3.) *Economy of Labour.*—In order that economy of labour on the dairy-farm may be effected, it is necessary to arrange the work that the whole working staff spend as much time as possible at profit-making tasks. This may involve the inclusion in the dairy-farm organization of such cash crops as will fit with little conflict into the dairy routine and such as will utilize by-products of time and material from the main enterprise of the farm.

"The successful operation of a dairy-farm business is a difficult task. It should be treated as a business and a complete set of farm accounts should be maintained. Such an accounting system will provide a guide to each succeeding year, and success based upon the written experience of the years gone by should be cumulative from year to year."

92. CREAM-MANUFACTURE FROM MILK AND BUTTER.

The Chairman of the Commission has recently had demonstrated to him one of the possible ways of obtaining an adequate supply of cream in times of milk-shortage. This was by the manufacture of cream from skim and sweet unsalted butter. The process observed would permit of cream-manufacture from whole milk and skim-milk, and, consequently, the maintenance of the cream-supply; that is, without skimming at all, simply by adding butter to natural milk. Two samples were produced, one 18 per cent. fat and the other 30 per cent. fat. No exception is taken to the process, other than the possibility of contamination from handling. It should be understood, however, that cream so manufactured should be so marked when offered for sale. A recommendation is made to this effect.

93. REDUCING THE BACTERIAL COUNT.

While the general supply of milk as sold from the wagons is of good quality, a careful examination of the records of bacterial counts made at the receiving-platforms by the proper officials indicates that here and there are producers, some of them raw-milk producer-distributers, who are not as careful as they might be. The records show that milk with a count as high as from 8,000,000 to 16,000,000 per c.c. has been passed by the professional platform graders as suitable for the whole milk trade. This product is, of course, pasteurized before it is sold. Some samples of raw milk as sold from the wagons carry 1,000,000 or more bacteria per c.c. This milk is generally used without pasteurization or boiling.

Reference is made elsewhere to an amendment to the "Milk Act" whereby the maximum count shall be gradually reduced from 1,500,000 to 1,000,000 to 500,000 for milk at the platforms just previous to pasteurization. While figures for large numbers of shippers are not available, figures for some of the shippers have been secured; and this number, about ninety in all, may be considered a fair sample of the producers and shippers.

About 15 per cent. of the milk shipped by these producers could have been rejected under the present regulations, which require not more than 1,500,000 bacteria per c.c. previous to pasteurization. In addition, 15 per cent. of the milk received at the platforms was above the 500,000 bacteria per c.c. recommended maximum, and though within the requirements of the law at the present time, it would not be within the requirements under the suggested amendments.

It is interesting to note also that of the ninety shippers referred to, only 17 per cent. delivered milk that was consistently below the 500,000 maximum contemplated. That is, under the suggested amendments, only 17 per cent. of the ninety farmers for whom records are available would not at some time during the year have had some milk rejected as unfit for pasteurization. Here and there a shipper with uniformly low count has failed to meet the requirements for a short period, but on advice or suggestion has quickly improved the quality. The records indicate also that not all "preferred raw" milk offered for sale conforms to the minimum requirements of the regulations all the time. True, the failure to meet the quality standards may not have continued more than a few days, but the fact that failure was noted only tends to emphasize the need for constant vigilance. Some few "preferred raw" producers have had uniformly low counts over the entire period of the records and the quality of the product distributed seems to have been very satisfactory.

It can be seen that a sudden tightening of the regulations might readily reduce the fluid-supply below the daily requirements. On the other hand, it is felt that as soon as attention is drawn to the situation an improvement will be noted, and in the period recommended—i.e., three years—a sufficient number of the producers will have modified their practice in such a way that the maximum count of 500,000 bacteria per c.c. will have been met. This statement presupposes, too, that the general recommendations with regard to increased price will be carried into effect.

94. THE PRODUCTION OF "CLEAN" AND "LESS CLEAN" MILK.

This question, "Does it cost more to produce clean milk than milk that is less clean?" has been raised many times. The question cannot be answered specifically. There are certain departmental rules and regulations laid down with regard to the grading of farms and the production of certified milk and preferred raw and ordinary market milk. The regulations governing the production of certified milk are thirty-eight in number (*see* regulations under the "Milk Act") and they are of such a nature that it undoubtedly costs money to live up to them. The definition of preferred raw milk in the same list of regulations is very simple in so far as the wording is concerned. There are three important requirements: (1) It must be produced on a Grade A farm; (2) it must contain not more than 30,000 bacteria per c.c. prior to distribution to the consumer (cream may have a 200,000 bacterial count); and (3) it must be bottled at the farm. The most of the extra expenses are in meeting the requirements of the regulations defining a Grade A farm and in the necessary bottling and sterilizing machinery. These regulations contain eighteen specific items.

The regulations as written and the grading as done are undoubtedly a guide to and an indication of the quality of the product being produced. To reiterate, *the grading based on the regulations is undoubtedly an indication of the quality of the product.* Since, however, these regulations deal largely with physical surroundings and equipment and not with "method," they cannot be said to accomplish all that might be hoped for them. A man or woman is to a large degree clean or not clean by inclination or nature and no number of regulations can improve the situation always. Regulations can, however, show the way to those who wish to improve. Information and general education along milk lines are also of importance, but a man must first know something of the nature of milk; that the milk business is largely a fermentation industry; *that there are innumerable sources of contamination; and that milk sours quickly or less quickly, depending on the temperature at which it is held.*

The man who knows milk, the nature of the product, what causes souring and spoilage, the value of the sterilization of utensils, the place of prompt cooling, and, at the same time, is naturally clean and tidy, can produce good-quality milk in buildings of low cost and without making a heavy expense in equipment and utensils. The factor of cleanliness is of first importance. The farm dairy may be of single-ply shiplap but have no cobwebs and dust on the ceiling and walls; the floor may not be of the most modern material but still be kept clean and sanitary; the building may not be painted but it can be whitewashed inside. Work can be done promptly and efficiently, manure removed regularly, and simple precautions taken in such a way that a high-quality milk can be produced. The regulations guide and help, but there is no reason why good milk should not be produced in the less pretentious surroundings. Undoubtedly, however, the farm-grading regulations will have to be maintained for some time. The recommendations advising a progressively decreasing bacterial count should lead to greater precautions being taken. But this paragraph is written to indicate very definitely and clearly to producers that the production of a high-quality milk is not necessarily a matter of very extensive and expensive buildings and equipment. An understanding of the nature of milk, a sense of cleanliness, and prompt cooling are factors of first importance. Without these prerequisites heavy capital expenditure is of little avail. The grading at the platform of the receiving-station should be the final test. The grading of the farm only supplements the platform grading of the product. Clean milk can be produced at as low a cost as milk that is not clean. Some encouragement in the nature of price would, however, seem to be necessary.

95. THE COMPLEXITY OF THE SITUATION IN THE DISTRIBUTING BUSINESS.

The largest factor in the production, distribution, and sale of milk and milk products is the Fraser Valley Milk Producers' Association. This association is: (*a*) Distributing retail;

(*b*) selling wholesale to retail distributers; (*c*) selling to independent dairies that may be short; (*d*) providing milk in emergencies in the city. In addition, it is manufacturing condensed milk, powdered milk, casein, and butter. It is selling some milk wholesale to a condenser. It is a non-profit concern, but pays interest on all bonds and working capital. What is left after all expenses, including interest, are paid goes to the farmer on the basis of the quantity and quality produced. The price mentioned in the contracts of most of the independent distributers is based on the monthly settling rate of the Fraser Valley association.

Some of the independents sell bottled milk retail mainly; some sell wholesale only (loose) to hotels and restaurants; some sell both wholesale and retail; some manufacture milk products to a limited extent; some are putting out a special fluid product. They buy from and sell to each other in part. Some deal direct with the individual farmer and some do not. Some buy part wholesale from the F.V.M.P.A. and part direct from farmers. No two distributers operate exactly alike and consequently it is difficult to compare them.

Some few distributers are also farmer-producers. These men are in the main producers of "preferred raw" and hold a place of some importance owing to the demand for their product. There are also several hundred "cow-owners" within the metropolitan area, some of whom distribute milk by hand to their neighbours. There is only one dairy producing "certified milk." These are all in competition with larger organized private and co-operative distributing businesses.

We have no record of any place where a comparable situation exists.

96. MILK (OR BUTTER) FAT CONTENT OF MILK SOLD IN THE CITY.

It is very gratifying to note that as we read page after page of the official records we find the words "all samples met their respective standards"; "all samples were free from preservatives and sediment." There is here and there an exception, but they are so few that they only tend to emphasize the high standards and uniformity of the product in these respects. Here are some monthly *average* milk-fat records from all dairies: 3.92, 3.97, 4.05 per cent. for three consecutive months in winter. For summer we find 3.82, 3.88, 3.91 per cent. for three consecutive months. The records vary up and down from these, but the average is fairly high.

It is of interest and value to note the average milk-fat content of all samples examined by the City Analyst over a period of years:—

	Per Cent.		Per Cent.
1922	3.66	1925	3.75
1923	3.68	1926	3.81
1924	3.76	1927	3.89

While it cannot be said that the milk-fat content on the average has increased markedly, it has nevertheless increased and as a whole shows a very fair average for all samples and grades sold in the city.

The above percentages refer to the arithmetic averages of all milk sold. A weighted average would indicate a somewhat lower milk-fat content. The minimum requirement of the law for milk-fat is 3.25 per cent.

97. THE SHIPPER GRIEVANCE ILLUSTRATED.

Illustration 1.—Suppose a co-operative shipper produces 400 lb. milk-fat per month. Under the pool system of payment at present used he would be paid as follows (the figures and percentages used are approximate, and are intended for illustration purposes only):—

400 lb. produced—

45 per cent. of 400 sold as whole milk and cream is 180 lb. at about 75 cents net	$135.00
20 per cent. of 400 sold as condensed milk, powdered milk, ice-cream, cheese, and skim is 80 lb. at about 55 cents a pound milk-fat	44.00
35 per cent. of 400 sold as butter is 140 lb. milk-fat at about 45 cents net	63.00
Total	$242.00

On the basis of this calculation 400 lb. would sell for $242, or 60.5 cents a pound net to the farmer, f.o.b. Vancouver.

Illustration 2.—Suppose an independent shipper produces 400 lb. milk-fat, and sells at the usual contract price, which usually is 7 cents (less deferred payment) above the co-operative price.

400 lb. at 67.5 cents..... $270.00

That is, 67.5. cents to the farmer, f.o.b. Vancouver.

Illustrations 1 and 2 show the basis of the controversy between the co-operative and independent shippers. The first received 60.5 cents per pound fat and the second received 67.5 cents per pound fat. The difference in price received is due to the market in which the products were sold. The independent shipper is not directly concerned with the final disposition of the milk after he has sold it; but, depending on the season, from 80 to 85 per cent. is sold by the distributer as fluid milk or cream. The balance is sold mostly as ice-cream and butter. (The percentages sold in the various forms vary somewhat according to the type of business conducted by the distributing company.)

Why the Greater Price?—As stated elsewhere, the contract with independent shippers generally refers specifically to the monthly settling rate of the F.V.M.P.A. The independent settling rate is in the main (sometimes more) 7 cents above the F.V.M.P.A. monthly settling rate. Why 7 cents? Why not 9 cents, or why not 5 cents above the monthly settling rate of the F.V.M.P.A.? This question was asked of every witness who was an independent distributer and whose contract made reference to the F.V.M.P.A. The gist of the replies indicated that in the opinion of the independent distributers, based on their experience, this was about the "bonus" that would call forth the necessary supply by inducing members to break away from the F.V.M.P.A. and ship independently, and at the same time hold their old shippers. It was also considered to be the lowest possible price that could be paid and still maintain their supply. Now and then a shipper has received a bonus over and above the 7 cents, and in a few cases special prices have been paid for special grades of milk. The independent shippers did not all admit that it was the 7 cents "bonus" that led them to break away from the association. In some instances it was general dissatisfaction with the management and general policies of the association, and in others there were specific grievances.

Can the Situation Continue?—The independent distributers, the business competitors of the F.V.M.P.A., with one exception, admitted the stabilizing influence of the association in the whole-milk market. No one wanted to see a return to conditions as they existed before the advent of the association.

The stabilizing influence of the association, the largest distributer, opened the way to private profits on the part of enterprising individuals. Also, certain men are experienced milk-vendors. It is the line of business they know best, and consequently it is the one to which they turn when an opportunity presents itself. From the point of view of the individual independent distributer this is good business. From the point of view of the public as a whole—the farmer-producer and the ultimate consumer—the situation does not present such a satisfactory picture.

The association has a large investment that has been made in order to distribute milk of high quality. It also has made an investment to take care of the less profitable quantity of milk not required for the whole-milk trade. Is the association, then, to continue in its various lines of endeavour—whole milk and by-products—or is it to become a by-products manufacturing concern only? Were this to come to pass, one group of farmers (independents) would enjoy the whole-milk trade with its relatively high price, and another group of farmers (co-operatives) would be taking care of the surplus at a somewhat lower price. The F.V.M.P.A. is asking that each farmer, independent as well as co-operative, take care of his proportionate share of the manufactured products. They have made it very clear that they alone cannot continue to do the manufacturing, provide emergency milk in times of shortage, open domestic and foreign markets for milk products, and encourage the development of the dairy industry as a whole. They are very definite in their request that the lower price due to manufacture should be shared by all producers, and also that the higher price of fluid milk should be shared by all producers. The very rapid decrease in supply during the fall months of 1928 and the near shortage would seem to indicate that the members of the association are not prepared to go to the expense of the fall breeding of cattle unless the remuneration is such that it pays them to do so. Other lines of endeavour may be more attractive. The actual shortage in city supply was due primarily to the drop in production on the part of the independent shippers, who, even with the bonus price, have not maintained their supply. The association's drop was heavy, but

it could draw on the supplies being delivered to the utility plant at Sardis or to the plant at Delair, but when this total quantity was not sufficient to provide for all commitments and emergency milk for the independents as well, at least one independent distributer had to draw from a foreign country for a short period.

The metropolitan area must be assured of a plentiful supply of good quality at all times. In order to be assured of this a large potential supply must be within call for delivery if required. This supply can be assured only by proper and adequate encouragement and the allaying of dissatisfactions that are now a canker in the field of production.

98. THE FRASER VALLEY MILK PRODUCERS' ASSOCIATION "DEFERRED PAYMENT."

The Fraser Valley Milk Producers' Association is an association of farmers—milk-producers—associated together for the purpose of assembling, grading, processing, distributing, and performing other functions relative to the production and marketing of milk. It is a non-profit organization. A certain reserve known as a "deferred payment" is held back during the year and might be called profit. This payment is made to the farmer in cash (or stock in the association paying 7 per cent.) on the basis of the amount of business he has done with the association; that is, a man who sold 2,000 lb. of fat through the association receives the same rate per pound fat but twice as much money as the man who sold only 1,000 lb. through the association. Similarly, the man who sells 6,000 pounds of fat through the association receives half as much in total dollars and cents as the man who sold 12,000 lb. through the association. The payment is a "deferred" one based on the milk-fat deliveries to the association. In one sense this "deferred payment" might be considered as profit, and in order to put all distributing companies on a comparable basis it has been considered as "profit" in the tables of comparisons used.

99. THE GROWTH OF THE ASSOCIATION.

The growth of the association in membership is indicated by the following table:—

Year.	Number of Members.	Milk-fat in Lb.
1917	848	1,709,528
1918	971	2,135,669
1919	1,287	2,449,225
1920	1,540	2,645,054
1921	1,691	2,788,051
1922	1,780	2,972,650
1923	1,841	3,044,219
1924	2,130	3,603,445
1925	2,344	3,782,779
1926	2,475	3,759,927
1927	2,703	4,051,287

The production for the first half of 1928 shows an increase of about 100,000 lb. of milk-fat over the first half of 1927. The production for the second half of 1928 may show a falling-off in production as compared to the last half of 1927. When production was relatively low, 1917, as much as 80 per cent. of the total production was sold as fluid milk and cream. In 1927 approximately 43 per cent. was sold as fluid milk and cream.

100. HOW THE BUSINESS OF THE FRASER VALLEY MILK PRODUCERS' ASSOCIATION IS DIVIDED.

During the year 1927, 42.9 per cent. of the production of the association was sold as fluid milk or cream, practically all in the City of Vancouver and adjacent municipalities. This amount includes milk and cream sold to other distributers in the city and adjacent municipalities for sale in the fluid form. Three and nine-tenths per cent. of the production was sold for the purpose of ice-cream manufacture. Thirty-three and six-tenths per cent. of the total production was sold as butter. Combining with this the skim-milk products, we have a total of 34.2 per cent. sold as combined butter and skim-milk products. The cheese account represents nine-tenths of 1 per cent. of the total production. The domestic market for evaporated milk took 7.7 per cent. of the total production. The export market for evaporated milk took 2.5 per cent. of the total production. The sales to a milk company evaporating or condensing milk in this Province amounted to 7.9 per cent. of the total production of the association.

That is, a total of 42.9 per cent. (43 per cent.) of the total production of the association that was delivered to the various plants was sold as fluid milk or cream. The balance was sold as ice-cream, condensed milk, powdered milk, butter, casein, and cheese, which products are generally referred to herein as milk products.

101. PLANTS OPERATED BY THE FRASER VALLEY MILK PRODUCERS' ASSOCIATION.

The Fraser Valley Milk Producers' Association operates a whole-milk plant in Vancouver, a condenser at Delair, and a utility plant at Sardis. The utility plant at Sardis can be used for a variety of purposes and is really the "surplus" plant of the association. It can provide more fluid milk for Vancouver or it can be used for the manufacture of milk products. Another plant at Ladner which has hitherto been used largely for summer surplus is being closed down. The first two plants mentioned above are being equipped to handle the summer surplus heretofore handled at the Ladner plant, which is being closed down.

102. FARMERS' CO-OPERATIVE ASSOCIATION IN THE RETAIL BUSINESS.

The Fraser Valley Milk Producers' Association is unique in that it is one of the few if not the only large farmer producing association in America that is giving efficient service direct to a consuming public. This is one of the few instances where the primary producer controls all the marketing services from the farmer to the ultimate consumer. These services are being performed at cost. About 30 per cent. of the fluid milk and cream sold in the city is being delivered from F.V.M.P.A. wagons. About 60 per cent. of the total amount of milk distributed in the city is milk produced by members of the Fraser Valley Milk Producers' Association.

103. HOW THE FRASER VALLEY MILK PRODUCERS' ASSOCIATION MEMBERS ARE PAID.

All the members of the association receive the same price for their milk-fat f.o.b. Vancouver if that milk is passed for the fluid market. That is, Vancouver is considered the base for the calculation of prices. It is recognized as the primary market for the milk production of adjacent territory. Milk to participate in the whole-milk price must have passed the graders at the receiving-platforms of the dairy, the Eighth Avenue plant, in Vancouver. Milk from farther or less convenient points may be delivered to either of the manufacturing or utility plants. This latter milk is also considered to be available for the whole-milk market, but is usually retained at the plant nearest production in order to save freight into Vancouver. All the milk going into these plants is graded the same as that going into the whole milk-distributing plant in Vancouver and is paid for on the same basis. Milk may be rejected or graded down, in which case it does not participate in the first or highest price. The price paid to the farmer is then arrived at by calculating the total net returns from all sources and dividing by the total number of pounds of milk-fat received. Similar calculations are made for lower grades. In principle, a part of each farmer's milk, assuming that that milk passed the grader as satisfactory for the fluid trade, is paid for on the basis of the portion that went into the fluid-milk and cream market, the portion that went into ice-cream, the portion into condensed milk, and the portion that went into butter and other products. Each man is thus given his proportion of each class of trade. Fluid milk brings the highest price and the products grade down in price to No. 2 butter (skim and casein are considered by-products of butter). This pool price f.o.b. Vancouver for 1927 was 59.9 cents per pound milk-fat, which is equivalent to 19.5 cents a gallon, or $1.95 a hundred for milk carrying 3.25 per cent. milk-fat. (It might be of interest to note that under the scheme known as the "Philadelphia Plan," which has received so much publicity and so much commendation recently, the price of 3.25 per cent. milk-fat f.o.b. Philadelphia is $3.29 a hundred. The great difference in price should be considered in the light of the fact that the Philadelphia price is a fluid-trade price, while the Fraser Valley price is a pool price based on the quantity and price of the product that went to the various markets.)

104. SOME PHASES OF THE MILK SITUATION AS SEEN BY THE PRESIDENT AND GENERAL MANAGER OF THE FRASER VALLEY MILK PRODUCERS' ASSOCIATION.

The following is quoted from the transcript of the evidence:—

Q.—Mr. ——, can you say whether there is another association of your size and with the same objective in Canada? A.—You mean that is doing the same as we are?

Q.—Yes. A.—I don't know of any dairy association that is doing the same.

Q.—Any other in America or the United States? A.—I don't know of a co-operative dairy organization in Canada or on the continent that is doing exactly what we are doing. We are more or less, what you might say, directly into every avenue of sale at the present time that we know of, for a sale of our product. There are other co-operative associations which are possibly doing one or two or three of the different phases, but I don't know of one which is going so far into it as we are doing. Not to my knowledge, at any rate.

Q.—Do you know any reason why these others have not gone into all the phases of it? A.—Well, no, I don't know why they haven't. Probably their conditions have been different to ours.

Q.—What would you say your association has done in the way of accomplishing a better quality of milk? A.—Well, I would say that the association has been a tremendous factor in the production of a better quality of milk in the Valley, in that we have, as an organization, spent a great deal of money and a great deal of time in educating our farmers along the line of quality production. We figured it was good business to educate them along that line, because in our first ventures we found that we were having some trouble with our product; and the only way in which you can be a successful operator is to have a good quality of product, and we have, as I say, spent a lot of money amongst our members.

Q.—One part of that drive to improve the quality was a grading system? A.—Yes.

Q.—That you put into effect? A.—Yes, we put a grading system in.

Q.—Just explain that will you, Mr. ——? A.—Well, really we might say, to come right down to brass tacks, when we made up our mind that it was necessary for us to go after our members, and endeavour to instruct them in the matter of quality production of milk, we decided that the ordinary grading which had been in existence for some little time was not good enough; it was better to make the appointment of a bacteriologist, and he was appointed by the organization; and a veterinarian—he was appointed as fieldman.

Q.—Can you say when those two were appointed? A.—I believe, in 1924. And we then introduced the sediment test, and each member gets a card sent him each month, and in some cases twice a month, showing his sediment test. That is, we take a test of his milk, and pass it through the sediment disk, and that disk is returned to him showing what sediment is in his milk. Then his bacterial count is taken, and he gets a report as to whether it is good, fair, unsatisfactory, or very unsatisfactory. The veterinarian, he gets a copy of the report from the laboratory, and he visits the members of the association who are in the unsatisfactory and very unsatisfactory counts. He calls on them and sees what methods they are using, and he assists them wherever he possibly can in overcoming any of their difficulties. If they have a very bad case, we send our bacteriologist out, who takes his whole equipment and goes out there, and probably stays at the farm for a day or two if necessary to help that member to clean up his milk, and I think that we can safely say for the past four or five years that this has been in operation we have improved the quality of our milk very, very largely indeed.

Q.—Have you lost any members through that? A.—Yes, we have lost some members.

Q.—Right from the start of that? A.—Yes, we have lost quite a few members.

Q.—Have you got a list of those you lost? A.—They could be secured. I haven't a list with me.

Q.—How would this result in the losing of them? A.—Well, some men would take very strong objection to having their milk turned down. They would claim that their milk was quite all right, and that if we could not take their milk some one else would.

Q.—Did they feed it to the calves and pigs then? A.—No, they have evidently been able to sell their milk; but whether they cleaned it up and sold it to somebody else I am not able to say, but they left our organization.

Q.—You mean they resented your veterinarian and bacteriologist going there. A.—Yes; some people are rather peculiar. It is a very delicate question to go into anybody's place and tell him he is producing dirty milk, especially if you happen to meet the lady of the house; she resents it very, very strongly, and some of them have left us for that reason; but we feel it is good business to continue along those lines because we figure it is going to get us results in the end.

Q.—Did you find any who accepted your veterinarian and bacteriologist and still could not meet your requirements? A.—No; practically in nearly almost every case there was a very great improvement. I won't say the improvement was all that we expected in some cases. In

some cases we still have trouble with them, and at certain seasons of the year we have to go back to them again, but more or less, even in the worst cases, they have improved quite a little from the fact that they have had that expert assistance.

Q.—Could you give us approximately the number that you have lost each year? A.—Well, approximately I would say between twenty-five—I would say around twenty-five a year. I won't say we lost them all for that one reason.

Q.—Twenty-five dairy-farms? A.—Yes, yes.

Q.—Would there be any other reason you could attribute to your losing members? A.—Yes; some of them wanted that additional 7 cents which the independent dealers would pay, and they left us because we wouldn't pay it.

Q.—And would those be included in the twenty-five? A.—Yes, they would be included in the twenty-five.

Q.—When did that start, Mr. ——? A.—Oh, that has been going on ever since we have been in the organization.

Q.—You don't grade the farms for the purposes of quality of milk? A.—No.

Q.—You grade the milk? A.—We grade the milk.

Q.—For your own purposes? A.—Yes.

Q.—One grade? A.—All milk, as it comes into the plant, is graded. We have two experienced graders—men who have a very keen sense of smell. We don't use the finger or the tasting system whatever. It is all graded, and immediately that man finds anything that in his opinion is not up to grade it is swung out—out of the line of milk and put to one side.

Q.—The smelling test? A.—Yes; and the bacteriologist will confirm the grader by taking his samples and applying the methylene-blue test, and if there is anything there that seemingly is serious the bacteriologist will go further into it, and the veterinarian is acquainted with all the milk that is turned down. He gets a list every day of all milk turned down, so when he is in the country he is able to call on the different farmers where he finds they have been having trouble with their milk.

Q.—And he has the reasons for turning of it down? A.—Yes; it states whether it is bad flavour, or sour, or whether it is bloody milk, or whatever it may be.

Q.—I want you to go back for a moment to the question previous to the last. You intimated you lost about twenty-five of your members per year? A.—Yes.

Q.—Which would be about 1 per cent. of the total membership? A.—Yes.

Q.—And at the same time you intimated that you got a marked increase in your membership; as I figured it, it was about 10 per cent. increase? A.—Yes.

Q.—Do any of the old members come back and make up a part of that? A.—No, very few. Once a man evidently who seems to have tasted that 7 additional cents, he hates to part with it again; but very, very rarely, unless a man gets into a row with the independent dealer, will he come back. I have known very, very few instances of him ever coming back.

Q.—Well, here we have 250 new farmers every year? A.—Yes.

Q.—Why don't they sell to the independent dealer? A.—well, I don't know why they don't. They probably happen to start up business at a time when the independent dealer is not anxious to secure any more milk—probably in the spring of the year when the independents have their quota, and naturally he comes to us. And some of them are men who come into the district from another place where there has been a co-operative association. A large number of them have come from Alberta, and they joined our association and they know all about the co-operative system.

Q.—They seem to be imbued with the co-operative spirit? A.—Yes, seemingly, because a large number of them come to our association direct, and say they want to join up.

Q.—Well, would they be convinced? A.—Well, they, I presume, are convinced that the association worked satisfactorily with them back there, and I suppose they figured if it worked satisfactorily for them back there it would work satisfactorily for them out here.

Q.—Reverting to the tests of cans on the platform, and say a man was shipping ten cans and each can was tested by the smell, would it happen sometimes that only a single can is bad out of the whole lot? A.—Sometimes a single can will go down and sometimes the whole bunch. It all depends on the quality.

Q.—Now, Mr. ——, the members you lose per year don't go out of business, I presume, do they? A.—No. Most of them are still in business.

Q.—And what becomes of their milk-supply? A.—Well, they sell to other dealers.

Q.—How is it your association cannot pay the same price as is paid by the others? I won't say "can't," but I will probably say "don't"? A.—Well, of course that is so simple to us. The man who is selling his milk to the independent dealer—the independent dealer markets practically all his milk—100 per cent. on the high market. He might have a small seasonal surplus; but he gets a return for that milk very much larger than is secured through the manufacturing channels. Our price is based on the returns from all channels—butter, milk, evaporated milk, cheese, and fluid milk. We take the returns which we get from all those different channels, and it is thrown into the pot, as the saying is, and so much is paid per pound butter-fat for every pound of butter-fat; and the independent dealer, he keeps away from the butter market. He likes us to manufacture butter, and he will do the distributing in the high market, and is naturally in a position to pay a premium over what we can pay. We never can hope to meet the price that the independent dealer can pay, simply because we are carrying the manufacturing.

Q.—Without considering the by-products, would you say the price which the producer gets is more or less fixed by what the consumer pays? What end do you start to calculate from? A.—Yes, it is more or less based on what the consumer pays; the return being the largest return through that particular channel naturally tends to raise the price of the manufactured product. The returns are greater.

Q.—There is really no profit, as I understand, in your association, to any particular person. It all goes into the pocket of the producer eventually? A.—Yes, it all goes into the producer's pocket.

Q.—Is that a true example of the method of fixing the price to a producer? A.—I just don't understand you.

Q.—Through an association of this kind as compared with a privately-owned company which takes a profit. Is there a difference in the method of fixing the price in the way you do it, as compared with a privately-owned corporation? A.—Well, of course, with the co-operative, the so-called profits that the independent takes for himself are passed back to the farmer.

Q.—Yes; but in addition to this fluid-milk supply, do you manufacture a great deal of by-products? A.—Yes.

Q.—Could you afford to pay the extra 7 cents which your competitors are paying if you did not have to manfacture any of these by-products? A.—Yes, we could afford to pay that 7 cents, and probably another 7 cents on top of it.

Q.—Will you be more definite on it? What could you pay if you only had the whole-milk market to consider at the present price? A.—In 1927 we could have paid 75 cents per pound butter-fat for every pound we sold in the city operations. In 1926 we could have bettered that.

Q.—Under what circumstances? A.—If we only had had sufficient milk to handle, so that it could be absorbed in the fluid-milk market in the city.

Q.—That is, if you were operating on an independent dealer's basis last year? A.—Yes.

Q.—Then the independent dealer is getting rather cheap milk? A.—Yes, I should imagine he is making a fair profit on his operation. When I say 75 cents—we have taken care of all our operating expenses, all our interest on our investment, and depreciation, when I say 75 cents.

Q.—Does your association supply other distributers in the city? A.—Yes, we supply quite a few distributers.

Q.—How many? A.—I think at the present time we are supplying about ten.

Q.—I think probably we should have the names of these. Have you a list of your independent distributers, retail and wholesale? A.—No, I haven't a list here.

Q.—I have seen the list confidentially and I would like to have a certified statement of that.

Q.—Mr. —— will most likely hand that in. That may be treated confidentially, Mr. ——. A.—It doesn't make any difference as far as the price is concerned. I think it is well known what we charge. We charge the dealers 70 cents a pound butter-fat. That is, the dealers who buy 100 per cent. from us pay us 70 cents a pound butter-fat.

Q.—Do I understand, Mr. ——, that you pool your total sales, or a certain amount of money from your sales, and then deduct all the expenses from your total sales? A.—Yes.

Q.—And what is left you pay to the farmer? A.—Yes, after taking care of everything.

Q.—That is, you don't deduct any profits? A.—No.

Q.—Do you deduct interest on your bonds? A.—Yes, and interest on our invested capital.

Q.—And pay the actual expense of operation? A.—Yes, including our depreciation.

Q.—That is, you begin at the total amount received for all your product rather than begin at the farmer and give him a price? A.—Yes.

Q.—It is just the opposite of the ordinary independent business? A.—That is right.

105. SOME COMMENTS FROM THE EVIDENCE WITH REGARD TO CO-OPERATIVE EFFORT AS EXEMPLIFIED BY THE FRASER VALLEY MILK PRODUCERS' ASSOCIATION.

Witness A.—"The estimate of the number of milking cows for the Lower Mainland is 42,500. This is based on the findings of the Federal veterinary officers in their work of the past year. The human population from the Provincial Secretary's office is approximately 346,500. From the returns that were given by the cow-testing associations we believe the average production of dairy cows on the Lower Mainland to be 5,300 lb. of 3.8 per cent.—approximately 515 gallons to about 201 lb. of fat.

"We believe that this is higher than can be found in any other district in British Columbia. The proportion of cows on test in the Dominion is less than 1 per cent. We have between about 6 per cent. and 7 per cent of the cows in this district on test. The Dominion average is very much lower than this. It is probably about 155 to 160 lb. of fat per cow."

The witness then gives reasons for this increase in British Columbia: much better foundation stock and the work of the Provincial cow-testing associations.

He continues: "Production in the Fraser Valley has increased considerably in the last twelve years and the methods of farming have improved in general. Dairy stock is very much better than it was twelve years ago.

"I attribute most of the increase in production to co-operative effort. I believe that previous to the application in the Fraser Valley of co-operative ideas and co-operative methods the dairy business was very nearly at a standstill. I would certainly not recommend going back to the previous chaotic conditions."

Reasons: A very much better understanding of marketing requirements, with special reference to dairy products. It has meant that more thought has been given by the farmers to the proper marketing of milk and cream, with the result that there has been in evidence far more intelligent team-work than would have been possible under other conditions. The successful methods that were used would naturally lead to confidence on the part of dairy-farmers, with an increased production. There is an increase in production at a greater rate than is the case with the population.

There is no doubt whatever that the farmers on the land and newcomers were given confidence by the presence of a co-operative organization. The confidence that the farmers show was undoubtedly the result of their own action.

Witness B.—"I think it is not that they (the dealers or distributers) are not satisfied with the Fraser Valley dealings as far as the milk goes. I haven't much complaint of that. The quality of the milk I get is good: but it is just the fact that they are in business, competing with ourselves. That is the biggest factor in it.

"I think the only recommendation I would suggest to the Commission would be for the Fraser Valley to sell out the retail business and take charge of the wholesale milk only—sell wholesale to the retailers. What I was thinking of was for them to control the milk—the wholesale end of the milk; and I do not think there would be a dealer in town who would not consent to buy it from the Fraser Valley then—if they could do that."

Q.—You don't quarrel with the fact that the Fraser Valley is a co-operative association? A.—No, no.

The statements of these two witnesses sum up the general opinion very well. The first supports co-operative effort with little or no reservations. The second supports co-operative effort, but with the one important reservation: that the association should not sell wholesale to retailers and then compete in the retail market with them. The general expression of other witnesses was that the Fraser Valley Milk Producers' Association had been a stabilizing influence; that the farmer was not getting too much for his product, even he who was getting the highest price; and that there should be no objection to him getting more.

The witnesses, especially the larger distributers, expressed no desire to see the co-operative discontinued, but rather stated very definitely that they were prepared to compete with the co-

operative so long as the conditions and opportunities were equal for both independents and co-operatives.

Again to quote from the evidence:—

Q.—You would say that the farmer is getting a reasonable price. How about the farmer? A.—I think that there is a possibility that the farmer is not getting overpaid for the amount of work he has to do. Of course, we are paying a premium over the co-operative farmers. I think we are paying more money than they are actually paying, but even at that I don't think we are paying the farmer a cent more than he is entitled to.

Q.—Would you be agreeable to a uniform price for an equal grade to farmers? A.—Nothing would suit us better if we could pay the same price as the co-operative association is paying to-day.

Q.—Would you consider a Board of Control somewhat similar to the Water Board of Greater Vancouver might be an advantage? A.—That is, control in what way, controlling the quality or dictating the whole policy?

Q.—Let me put it in this way, Mr. ——: A Board that would set a maximum price to be paid to the farmer, and a Board that would also protect the consumer by stating the price he should pay, say for pasteurized milk. . . . A.—Individually, I would be well satisfied with a Board like that because I can always compete. As long as I am competing on the same basis as the other fellow, it doesn't worry me at all. You can put in any conditions you like. I am willing to compete on these lines.

106. WHAT BECOMES OF THE TOTAL PRODUCTION OF COMMERCIAL MILK.

Total Production that enters into Trade: 124,000,000 lb. or 12,400,000 gallons.

	Per Cent.
Whole milk and cream	56.1
Ice-cream	2.6
Butter	26.1
Powdered skim-milk	.2
Casein	.4
Condensed milk	13.9
Cheese	.7
	100.0

Approximate Amount of Milk coming into City: 73,000,000 lb. or 7,300,000 gallons.

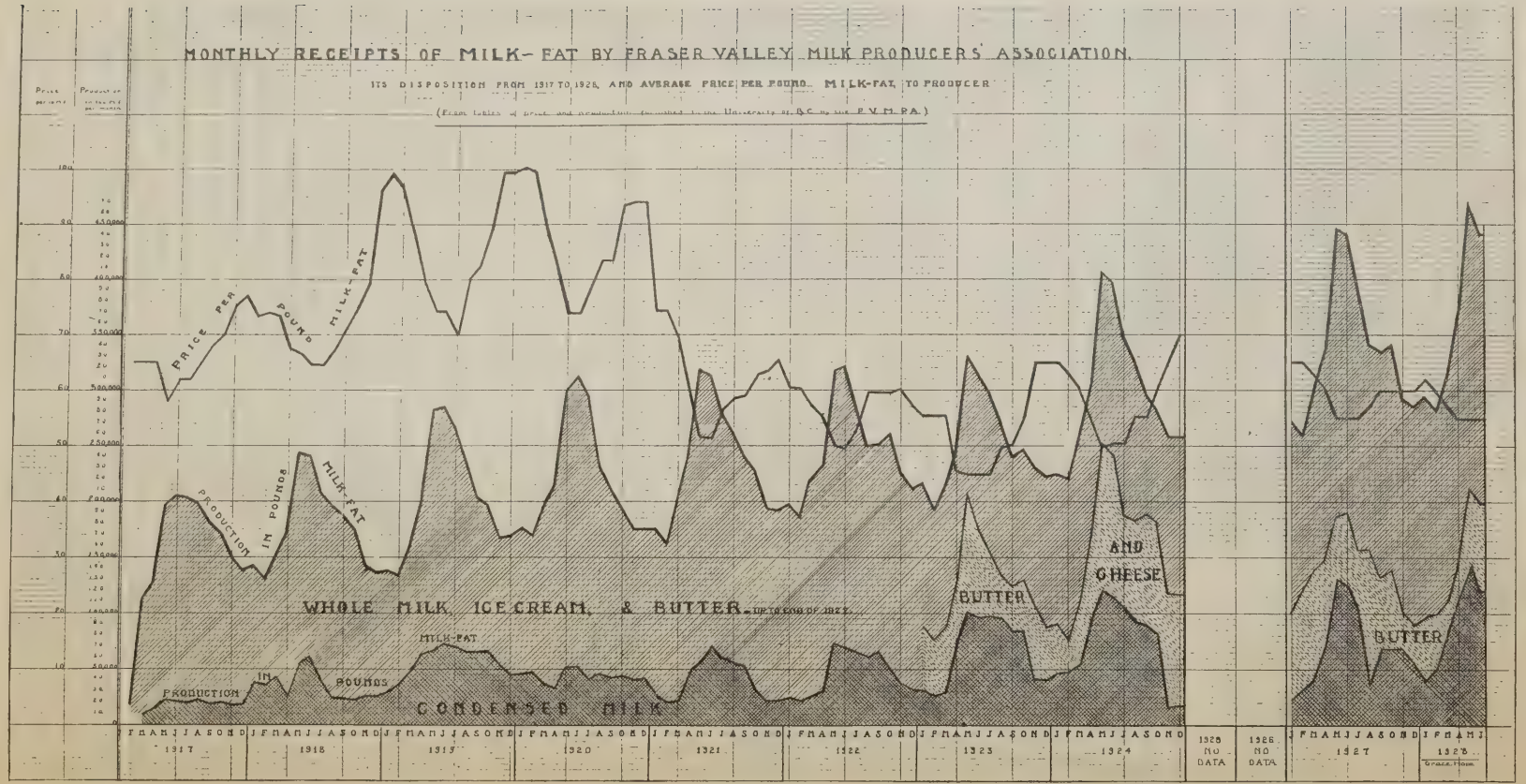
What it is used for—	Per Cent.
Bottled—milk and cream	71.2
Wholesale	23.6
Butter	2.9
Ice-cream, etc.	2.3
	100.0

107. WHERE BY-PRODUCTS GO.

The following is a quotation from the evidence:—

Q.—Will you explain, Mr. ——, what your association has done in developing the by-products of milk? A.—Well, I think I mentioned that before. We are manufacturing powdered milk, both whole powdered milk and skim powdered milk. The whole powdered milk we market in a great many countries of the world to-day. We are shipping that to China.

Q.—Direct or through agents? A.—Some of it direct and some through agents to China, Japan, South America, and Great Britain; and we are also a very heavy manufacturer of casein. We have a very large plant manufacturing casein. We are shipping casein throughout the Dominion of Canada to United States and to Japan. We are making semi-solid powdered milk that is going all over British Columbia to-day and some of it is going into Alberta. We are manufacturing condensed milk. Our condensed milk is going all over the world to-day. We are shipping to Great Britain. We are shipping to South America. We are shipping to China. That really covers our by-products outside of butter. Our butter is all sold in British Columbia.


MONTHLY RECEIPTS OF MILK-FAT BY FRASER VALLEY MILK PRODUCERS' ASSOCIATION.
ITS DISPOSITION FROM 1917 TO 1928, AND AVERAGE PRICE PER POUND MILK-FAT TO PRODUCER
(From tables of price and production furnished by the University of B.C. to the F.V.M.P.A.)
PRICE PER POUND MILK-FAT
PRODUCTION IN POUNDS MILK-FAT
WHOLE MILK, ICE CREAM, & BUTTER - UP TO END OF 1923.
BUTTER AND CHEESE
BUTTER
PRODUCTION IN POUNDS MILK-FAT
CONDENSED MILK
1917
1918
1919
1920
1921
1922
1923
1924
1925 NO DATA
1926 NO DATA
1927
1928 Grace Hom

108. MONTHLY RECEIPTS OF MILK-FAT BY FRASER VALLEY MILK PRODUCERS' ASSOCIATION, AND ITS DISPOSITION, FROM 1917–28, WITH AVERAGE PRICE PER POUND.

(*See* chart entitled "Monthly Receipts of Milk-fat," by Fraser Valley Milk Producers' Association.)

This chart indicates (total shaded portion) the month-by-month co-operative production of milk in the Fraser Valley (recorded as pounds milk-fat) from the formation of the F.V.M.P.A. to the middle of 1928 (omitting two years, 1925 and 1926, for which no figures were available).

Above the shaded portions runs a line indicating corresponding price to the co-operative producer, in cents per pound milk-fat, month by month, over the same period.

The shaded portion as a whole is subdivided by varieties of shading, showing the different channels by which the total milk produced was disposed of. Up to 1922, inclusive, the division is into two portions—the upper slant-ruled portion representing the pounds milk-fat disposed of as whole milk, ice-cream, butter, and cheese; the lower cross-ruled portion, the pounds milk-fat disposed of as condensed milk. Powdered milk and casein are made from the skim-milk mainly, and are therefore included with the butter; the returns from powdered milk and casein, increasing the returns from milk devoted to making butter, and therefore going in with the butter price. Whole-milk powder is on a different basis, requiring, of course, the cream as well as the skim for its manufacture; but the amount manufactured here up to date has been negligible.

Beginning with 1923, the shaded portion shows a further division of the whole milk, ice-cream, butter, and cheese, so as to record the first two together in slant ruling, and the second two together in interrupted lines.

On the left of the diagram are two columns of figures, the first listing the scale of prices per pound milk-fat, the second pounds milk-fat. At the bottom of the diagram are shown the years from 1917 to 1928, by months.

Studying the chart as a whole, it is evident that the total milk production (total shaded portion) has fluctuated widely each year in recurring waves, the high points of which occur about May and June, the low levels about November to February.

The height of these waves is fairly uniform, with their crests showing a general tendency upward; but the total production has more materially increased—in fact, has practically doubled in the eleven and a half years recorded. This means that while the summer overproduction (the waves) has increased slightly, the total production has very much more than kept pace with it, so that the winter production of the last four years is not far from the summer production of the earlier years. This all indicates a general drift towards more uniform production throughout the year.

Concerning the disposition of the whole milk thus produced, it will be seen that a gradually increasing proportion has gone into condensed milk. Naturally the amount so disposed of has shown annual fluctuations also, the manufacture being greater in those months of greatest whole-milk production.

The whole-milk and ice-cream disposition has certainly increased; also the butter and cheese, but in smaller proportion. In the case of the two latter the annual fluctuations correspond well with those of total production.

The tendency of all milk-sellers is, of course, to dispose of the milk in those channels giving the highest returns; hence in whole milk, ice-cream, and condensed milk, rather than in butter or cheese.

The price per pound milk-fat to the producer—i.e., the return to the farmer for his skill and labour in production—has not increased, but rather has decreased. Thus the high price of 1928 is but little above the low point of 1917. The fluctuations have been annual also, and inverse to the production, falling as production increased, rising as production decreased.

The price fluctuations seem to show a tendency to lessen, which means that uniformity of price throughout the year is being approximated, just as greater uniformity in production throughout the year is also being approached; but in both instances the processes have not gone far enough to yield either stability or economy in disposition.

One economic disadvantage of the annual fluctuations in production is especially well illustrated in the case of the manufactured products, condensed milk, butter, and cheese. The plants for these must be built, equipped, and manned on a scale sufficient to take care of the maximum summer production or peak load, yet cannot be otherwise than relatively idle during

the winter months of low production. Hence the capital invested is earning to its full extent only during part of the year; the equipment is not used continuously to full capacity; the trained personnel is employed but part time. These same plants, able to care for the peak loads, would run to much greater advantage to all concerned if the peak-load level could be maintained throughout the year.

It is obvious that increasing production is desirable, but greater uniformity of production is even more desirable, together with a greater uniformity in price to the producer.

It is the aim of the Commission not to change the direction of these natural tendencies, but to aid and increase them, and to hasten that arrival by the immediate establishment of desirable conditions such as would ultimately develop of themselves under the pressure of necessity, but which by timely foresight may be brought sooner into play.

One of these steps which was particularly urged by the Commission, and is prominent in the plans herewith recommended, is the reduction of the annual fluctuations shown in this chart; which, of course, involves the establishing of more uniform quantities of production throughout the year. In order to encourage this the Commission recommends the establishment of the principle that the proportion of winter production of each producer of standard milk receive the fluid pool price per pound milk-fat; and that in summer the same absolute quantity be paid for on the same basis, and that all milk produced in summer in excess of the winter basic quantity be paid for on the basis of the products' price.

109. CHILLIWACK DISTRICT.

The utility plant at Sardis receives approximately 80 per cent. as much milk as the whole-milk distributing plant of the F.V.M.P.A. in Vancouver. A glance at the maps showing the locations of the various producers and the geography of the cow population will indicate at once the concentration of a relatively large volume of milk in this, the Sardis-Chilliwack District. It is doubtful if there is any other district in the Lower Fraser Valley where there is as large a supply of milk of good quality. Most of the supply for this plant comes from within a 10-mile radius. The total percentage of milk delivered at all plants in a condition indicating sourness is very small when compared to the total supply delivered, but the percentage reaching Vancouver in this condition is approximately three times the percentage going into the Sardis plant. This would seem to indicate that either factors of delivery to Vancouver are less efficient than to the Sardis plant or the quality of the production is a little higher in the Chilliwack Valley. There is undoubtedly a large supply of good milk within easy distance of the city by rail should it be required. The difference between the freight rate from this district and points closer in is approximately four-fifths of a cent a gallon or one-fifth of a cent a quart. The Chilliwack District is well within the "milk-shed" of Vancouver and producers closer to Vancouver have this large supply of good quality to consider now and in the future. It is also a reservoir of supply available as needed and with the development of the Sumas area will largely increase over a period of years.

Quite a large quantity of milk received by the independent distributers comes from this district, Agassiz, and beyond. In no case did a distributer admit that the quality of the product received from these areas was not at least equal to the quality of the milk from closer in or nearer the city. Some arguments were advanced against this product being considered as a part of the fluid-supply, but the records tend to emphasize its quality, and since this is the case it might well take precedence as required for the fluid trade over milk of lower quality produced nearer the city.

110. WHICH PRODUCER SHALL ENJOY THE WHOLE-MILK MARKET?

Very definite representations have been made with regard to which farmers should be permitted to enjoy the whole-milk market. Some nearest the city have maintained that milk should be accepted for fluid consumption only on the basis of proximity to the city. It has been maintained that lands nearer the city are higher-priced, and consequently deserve some preference in the higher-priced fluid market. It has also been maintained that it is possible to deliver the milk more quickly to the city, so that it may be fresher when the consumer receives it.

The zoning of the country in such a way that the production nearest the city would get first choice would, at the present time, exclude only that part of the production which takes place in the Chilliwack Valley, and east from there. A careful analysis of the figures indicates

that the Chilliwack Valley contains a larger quantity of good milk within a small radius than any other section of the valley. The quality of the general run of this product as delivered to the manufacturing plant is, as indicated elsewhere, somewhat higher than a similar quantity from any other area, not excluding the farms in close proximity to the city. Are we to exclude, then, this large quantity of high-quality milk?

In times of shortage, and in times of emergency in the past, such as the heavy snowfall of the winter of 1927–28, when the truck deliveries failed, and some independent distributers could not obtain their supply promptly, milk was drawn from this area and from the products plant at Delair. This large potential supply is a safety-valve to the city supply, and can scarcely be treated as convenience or emergency milk always.

We hold to the view that the higher-priced fluid market is open to all farmers who can meet the required standards of quality, and who desire to reach, and can reach, this market. The basis of competition is the quality of the product, and ability to deliver, rather than proximity to the city as measured in miles. The second competitive factor is the ability of the farmer to produce and deliver within the equalized price f.o.b. Vancouver. Such an arrangement permits of competition on a quality and cost-of-production basis rather than a territorial basis.

"Assuming a fixed price f.o.b. Vancouver, it is obvious that a farmer with a production cost above this cannot long continue in this business. It will be necessary for him either to lower his production costs or change to a different system of farming."

111. SHOULD THE PRODUCER BE IN THE DISTRIBUTING BUSINESS?

Two groups are diametrically opposed on the question of distribution. The co-operative group definitely holds that some measure of direction over distribution is advisable, and that this measure of direction is best obtained by entering into the field of distribution in competition with private or independent distribution. The independent distributers, on the other hand, have held in part that the distribution field is their field and that the farmers' association should get out of it. The traditional practice for a century or more and the common practice of to-day in most cities is for farmers' associations to sell to independent distributers. In other places the independent distributers are not in the producing field and the farmer-producers are not in the distributing field. We feel, however, that in other industries there is a decided integration or linking-up of the marketing and producing services taking place at the present time. Large distributing concerns have gone into the manufacturing field and have obtained and exercise control over raw products, manufacturing, wholesaling, retailing, and other marketing services. Even in this Province and in the Province adjoining, a large company owns ranches, does its own assembling, slaughtering, wholesaling, and in part retailing. There is undoubtedly some economy in operation under such a system. As compared to a co-operative a private company or a corporation is operated for private gain in the nature of interest on the investment. A co-operative, on the other hand, operates for service to the producer and is concerned in giving the consumer a quality product at a price that he will continue to pay and which will encourage the producer to produce more. The emphasis is on the product rather than on interest on the investment in the co-operative association.

Undoubtedly a reasonable measure of sales direction is an advantage to both producer and consumer and it is fair to assume that this control should rest in large measure with the producer or manufacturer of the article. This seldom has been the case with farm commodities. In this Valley we have a co-operative association exercising some measure of sales direction in the interest of the producer and consumer. It is a non-profit organization. The charges of inefficiency levelled against it are not borne out by an examination of the records of the organization as compared to those of private concerns (*see* page 80). It is in a position to do its own collecting, grading, manufacturing, storing, wholesaling, and retailing. It has milk to sell and it is quite natural to sell as much as possible of this in the market that pays the highest price—the fluid market of the city. It is in its interest to sell as much as possible. It is not interested in "spreads" for profits. All gains due to efficiency in organization go back to the original producer and are his chief incentive to produce more of good quality. The case seems sufficiently clear to warrant the statement that knowledge of distribution and spreads at cost can best be obtained by entering the business, and since the farmer is the man who has most to gain or lose by efficient or inefficient distributing methods, he has every right to insist that milk be delivered to the consumer in plentiful supply of good quality at the lowest possible cost. He also

has an incentive to insist that the consumer get the product at the lowest possible price. The more the consumer uses in the fluid form, the more he gains. The business competition between the opposing groups is the struggle between the co-operative principle and the private-profits principle; and we hold that in the case of a commodity so vital to the public welfare as milk the principle of service as compared to private profits should come to prevail. We consequently repeat that, subject to the safeguards laid down, legal, health, and economic, and unless it is desired that the spirit of mutual frustration should be tolerated, the recommendations as made should prevail and the farmers' organization should not be discouraged in their efforts to hold or extend their wholesale and retail distributing business.

112. COSTS, EXPENSES, AND PROFITS COMPARED.

An effort has been made from examinations of the 1927 annual statements and other data submitted by the distributing companies to analyse the business situation of the various companies and compare them for efficiency and method. Dairies (*see* table, Dairies compared) A, B, and C are largely retail distributers; Dairies D, E, and F are largely wholesale distributers; and G and H have businesses of a varied nature. *The Fraser Valley Milk Producers' Association appears twice in the table.* The deferred payment of the F.V.M.P.A. or part of it has been placed in the profit column in order not to disclose the identity of the association. All dairies are identified by letters because the figures on which the calculations are based were given in confidence.

DAIRIES COMPARED.

	A.	B.	C.	D.	E.	F.	G.	H.	Average.
Net profit	2.64	2.46	2.31	0.91	1.63	1.66	1.94	6.89	2.55
Office expense	6.85	7.09	4.30	2.47	4.08	4.07	6.62	3.34	4.85
Delivery expense	19.31	20.95	19.96	12.72	6.87	9.83	10.35	8.99	13.63
Plant expense	12.65	12.27	11.83	9.67	8.56	9.01	13.31	6.76	10.52
Cost of material	58.55	57.23	61.60	74.23	78.86	75.43	67.78	74.02	68.45
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

The figures should be accepted only as a guide to the situation or for comparison and not as absolutely indicative of the situation. As stated elsewhere, no two dairies operate exactly alike; some are both wholesale and retail in nature; some buy direct from the country only, others from a wholesale distributer only. One manufactures largely, another manufactures to quite a large degree, and the remaining five do but little manufacturing.

The table assumes that the consumer or householder buys a dollar's worth of milk tickets; or a restaurant or hotelkeeper buys a dollar's worth of milk. Where does this dollar go or what proportion of it goes for profits, what proportion for office expense, what proportion for delivery, what proportion for plant expense, and what proportion does the farmer get?

The percentage the farmer receives is expressed as a percentage f.o.b. Vancouver. An additional percentage varying from about 3 per cent. up to 5 per cent. must be deducted for freight or hauling charges out of the consumer's dollar in order to arrive at the percentage net the farmer receives. (This is percentage, not cents per pound milk-fat.)

Profits would not seem to be exceptionally high since in the retail business they range from 2.31 per cent. up to 2.64 per cent. and in the wholesale business from 0.91 per cent. up to 1.06 per cent. Delivery expense, as can readily be seen, varies with the type of business; plant expense varies similarly, and cost of material is the percentage that is left after profits and expenses have been deducted.

Some few witnesses have attributed a part of the ills of the Fraser Valley Milk Producers' Association to what they claimed to be excessive overhead. There is no similar organization among the independents with which to compare this association. We can, however, compare the city distributing business with somewhat similar distributing businesses; that is, the business of the Eighth Avenue plant with a somewhat similar private business in the city. When compared in this way the advantage in efficiency seems to rest to some degree with the co-operative association. At the same time it might be that the apparent lower costs are really due to volume, and consequently it might be possible to reduce costs materially and so pay a

larger price per pound fat to the farmer; but the figures as presented do not indicate any less efficiency in the F.V.M.P.A. than in the private businesses.

113. SEASONAL SURPLUS AND SEASONAL SHORTAGE IN RELATION TO HOTELS, CAFES, AND RESTAURANTS.

A careful study of the contract prices between the various distributers and the hotels and restaurants for milk in bulk tends to emphasize the great variations in prices. Most of the contracts range between 25 and 33 cents per gallon; 33 cents is quite a popular price, 30 cents is equally popular, and 28 cents almost as popular. These three prices include the great bulk of the milk sold loose. A few quite large contracts are at the lower prices.

Why the great variation in price? The quality or milk-fat content of the milk has something to do with it, but the general situation in the milk trade has more to do with it.

In a broad sense the milk business would be simplified if the supply could be regulated to meet the demand exactly from day to day. An effort is made to avoid shortage and also to avoid oversupply, but the very nature of the production, the daily, weekly, or seasonal fluctuations, make it impossible for the independent distributer buying direct from the country to regulate the supply exactly. The contracts in the main call for the total production of the farmer and this production is bound to fluctuate. Because production and, consequently, shipments to the city vary, some independent distributers tend to contract short; that is, to receive from the country during the season of lowest production less than is required for their regular trade. This shortage they hope to make up temporarily by buying from the general surplus of the Valley or from some distributer who may temporarily have more milk than is required for his immediate fluid trade. Very often a bonus of 5 cents a pound milk-fat is paid for this convenience or emergency milk. This shortage to any one shipper in winter is filled by the regular shippers during the summer when production is highest. The regular producers may even ship a larger quantity than is required for the immediate need of the distributer, in which case he finds himself long, and consequently must look around for a market in which he can sell to best advantage. Other distributers who are temporarily "short" may take some of it, but when this is impossible the surplus may find its way into some channel of manufacture. The contract "short" for the winter has, however, tended to reduce the surplus of that particular distributer for the summer. The question he has had to answer is whether he makes most by buying some milk at a "bonus" price in the winter or by selling a large quantity at a much reduced price for manufacture in the summer. The possible loss or gain on the "short" must be balanced against the possible loss or gain on the "long."

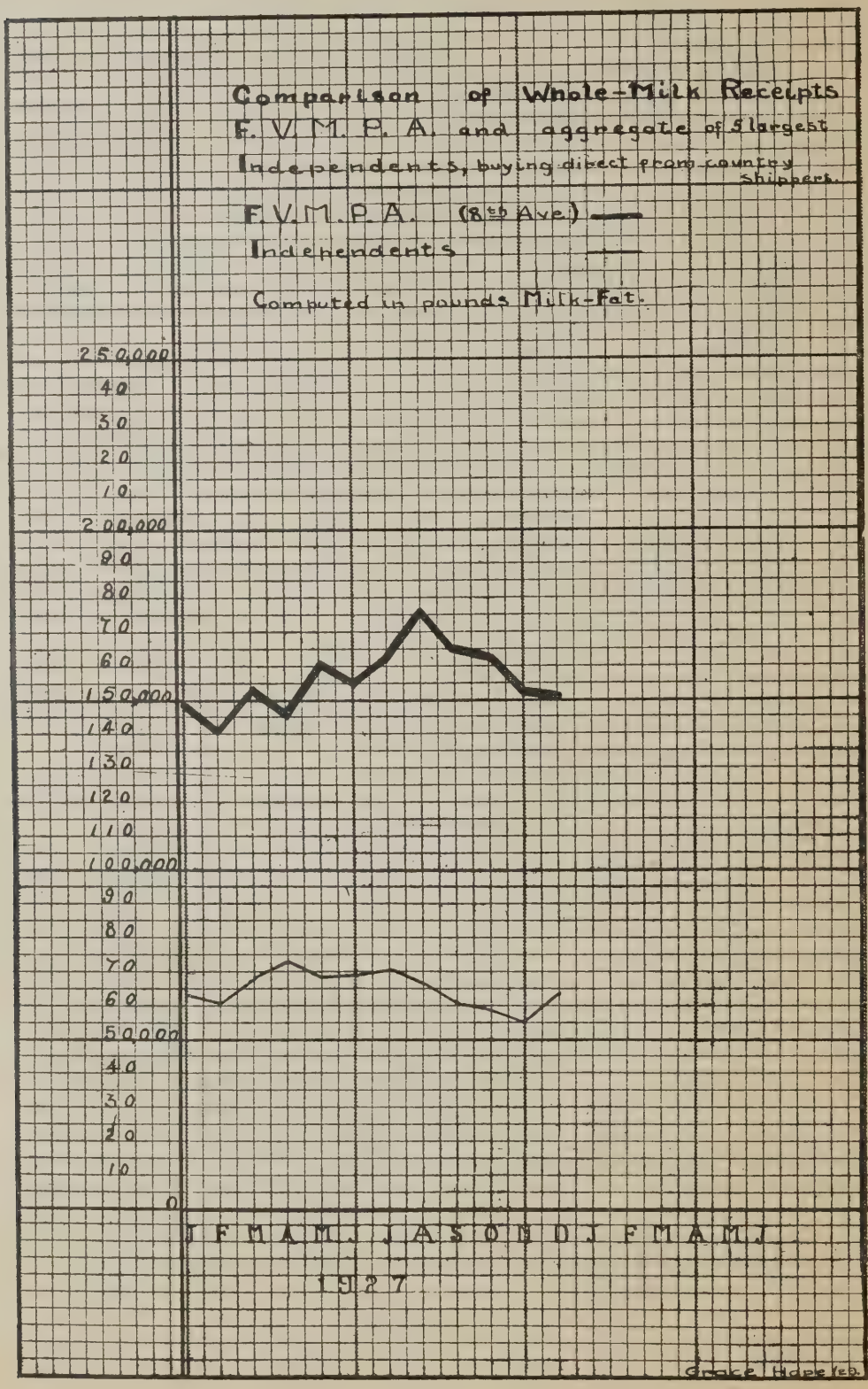
Out of this general problem, however, has grown another of somewhat more consequence. Milk-fat manufactured into butter is worth about 45 cents a pound retail. It may be worth more or less. Milk is offered to the hotels and restaurants at various prices per gallon. At 35 cents a gallon the milk-fat in it sells for 0.969 cent a pound. At 30 cents a gallon the milk-fat in it sells for 0.831 cent a pound, and so on down to 26 and 24 cents a gallon, when the milk-fat sells for 0.72 cent and 0.665 cent a pound respectively. The distributer then has two choices. If he is not in the manufacturing business he may be tempted to take a very low price for the milk, even almost as low as a butter price. But he can do a little better than this. The milk-fat has cost him about 62 to 70 cents f.o.b. Vancouver. It is better business to sell at cost than to manufacture; hence the incentive to cut prices to a point where, if a profit cannot be made, at least the loss is reduced to a minimum. A percentage of the restaurants and hotels are consequently enjoying very favourable prices. Some others are paying about what the product is worth. It is obvious that all hotels and restaurants are not likely to get milk at a loss to the producer for any great length of time. In our opinion a more uniform price, not so low that production is discouraged, would be safer in the long run.

The following shows the contract prices of some of the hotels and restaurants:—

114. BULK-MILK SALE—PRICE IN CENTS PER GALLON.

Rate in Cents per Gallon.	No. of Customers.
24	1
25	3
26	5
27	4
28	18

CHART K.


Comparison of Whole-Milk Receipts
F. V. M. P. A. and aggregate of 5 largest
Independents, buying direct from country shippers.
F.V.M.P.A. (8th Ave.)
Independents
Computed in pounds Milk-Fat.
250,000
40
30
20
10
200,000
90
80
70
60
150,000
140
130
120
110
100,000
90
80
70
60
50,000
40
30
20
10
0
J F M A M J J A S O N D J F M A M J
1927
Grace Hopper

Rate in Cents per Gallon.	No. of Customers.
29	3
30	20
31	5
32	3
33	20

These figures are taken from the sworn statements and are a fair indication of the prices paid by the various hotels, restaurants, and similar businesses under agreement or contract. The figures do not include retail stores; nor do they include restaurants and hotels that pay cash for the product as delivered. Not all contracts are included, but only those where definite statements were available. The price per gallon has been calculated to the nearest cent, since regular discounts have been enjoyed in some cases and special discounts in others.

115. COMPARISON OF WHOLE-MILK RECEIPTS, FRASER VALLEY MILK PRODUCERS' ASSOCIATION AND INDEPENDENTS.*

From January to December, 1927, comparative figures are available of the actual amounts received, month by month, by each from its respective shippers; these are tabulated on chart K.

The fluctuations, January to June, inclusive, of the independents were within the range of 60,000 to 75,000 lb.; that of the F.V.M.P.A. of 140,000 to 175,000 lb., which ranges are roughly equal. The high peak of the independents was in April; that of the F.V.M.P.A. in August.

The fluctuations of each follow the other fairly closely for the first three months, and for September, October, and November, but from April to June tend to be inverse. From July to September the curves are quite sharply diverse, the F.V.M.P.A. going up and the independents down; after which they are more or less parallel again until November, when they are again inverse.

The explanation of the minor variations are obscure; but the decided rise of the F.V.M.P.A. in August and the corresponding decline of the independents seems to be due to the facts that the independents tend to deal with their own shippers direct, turning as far as possible all their receipts into the fluid market; and that in winter, to avoid surplus, they restrict the number of their shippers to the point where the total product is just under the expected requirements. If this amount should prove to be short on occasion, purchases are made from the F.V.M.P.A. to cover the deficit. When summer comes the usual overproduction from these shippers cannot be avoided, but is less than it would be if a larger number of shippers, such as would give assurance of abundance in winter, had been contracted with.

After August, when the surplus falls off, the independents again turn to the F.V.M.P.A. for their supply; hence the F.V.M.P.A. shows larger fluid-milk receipts, brought in by diverting from their manufacturing plants to supply the independents; while the independents show small receipts from their own shippers because they are buying from the F.V.M.P.A.

116. COMPETING DAIRIES.

COMPARATIVE TOTAL SALES, MILK-FAT, SALARIES, AND WAGES, ON THE BASIS OF $1,000.

Dairy.	Sales.	Milk-fat.	Salaries and Wages.
A	$1,000.00	1,023.7	117.8
B	99.6	114.2	26.2
C	79.8	59.8	26.2
D	66.9	52.6	8.1
E	51.9	53.9	6.6
F	33.1	28.9	3.2
G	32.4	30.1	4.5
H	28.6	9.2	3.1
I	5.4	4.7	0.4

The above table shows the comparative sizes of some of the distributing businesses. The largest distributer is represented as having a business totalling $1,000 in sales; the total sales

* *See* chart, Comparison of Whole-milk Receipts, etc.

of fat being 1,023.7 lb. The next largest business would then be represented by $99.6, the next largest by $79.8, and so on down the list. Not all the data for all dairies were available, and consequently some dairies do not appear on this list. The proportion of fat handled by each dairy appears in column 2, and the expenditure for salaries and wages appears in column 3.

The table needs little comment, but is worthy of some study.

117. NUMBER OF SHIPPERS TO EACH DAIRY IN THE CITY.*

A	686	H	6
B	70	I	6
C	72	J	6
D	66	K	3
E	52	L	1
F	29		
G	26		1,023

The two sources from which the above estimates were obtained do not agree and consequently the figures have been adjusted. These are from midsummer lists and it is expected that the number of shippers would increase by about one-third during the winter months. The absolute figures, which are not available, would show a variation from month to month. The increase in number in the winter would be largely to the F.V.M.P.A. It is estimated that about 300 to 350 dairy-farmers in addition to the above ship milk to the city at some time during the year.

All actual and all potential shippers would of necessity have to come under the permit system.

118. MAP SHOWING LOWER FRASER VALLEY MILK-SHIPPERS CLASSIFIED.

The area known as the Lower Fraser Valley extends east and west about 90 miles from the Gulf of Georgia to the vicinity of Hope and Laidlaw. It thus forms a narrow east-and-west belt of from 20 to 40 miles wide, north and south, following the course and on both sides of the Fraser River, but with most of it on the southern side.

This area is most heavily populated at the western or gulf end, where in a few square miles are concentrated 320,000 people. This area includes Vancouver, North Vancouver, West Vancouver, South Vancouver, Point Grey, Burnaby, Richmond, Ladner, New Westminster, and some others. South Vancouver and Point Grey become part of Vancouver on January 1st, 1929.

The rest of the area is diversified land containing streams, lakes, level plains, rolling plains, bench land, forested land, cleared land, and is rich and productive. About one-third of it is now under cultivation. It is peculiar in that it is the only great agricultural area adjacent to the chief population of British Columbia; i.e., to that population (more than half of the total population of British Columbia) which is resident in and about Vancouver.

This Lower Fraser River Valley area is practically identical with the present Dominion T.B. Free area.

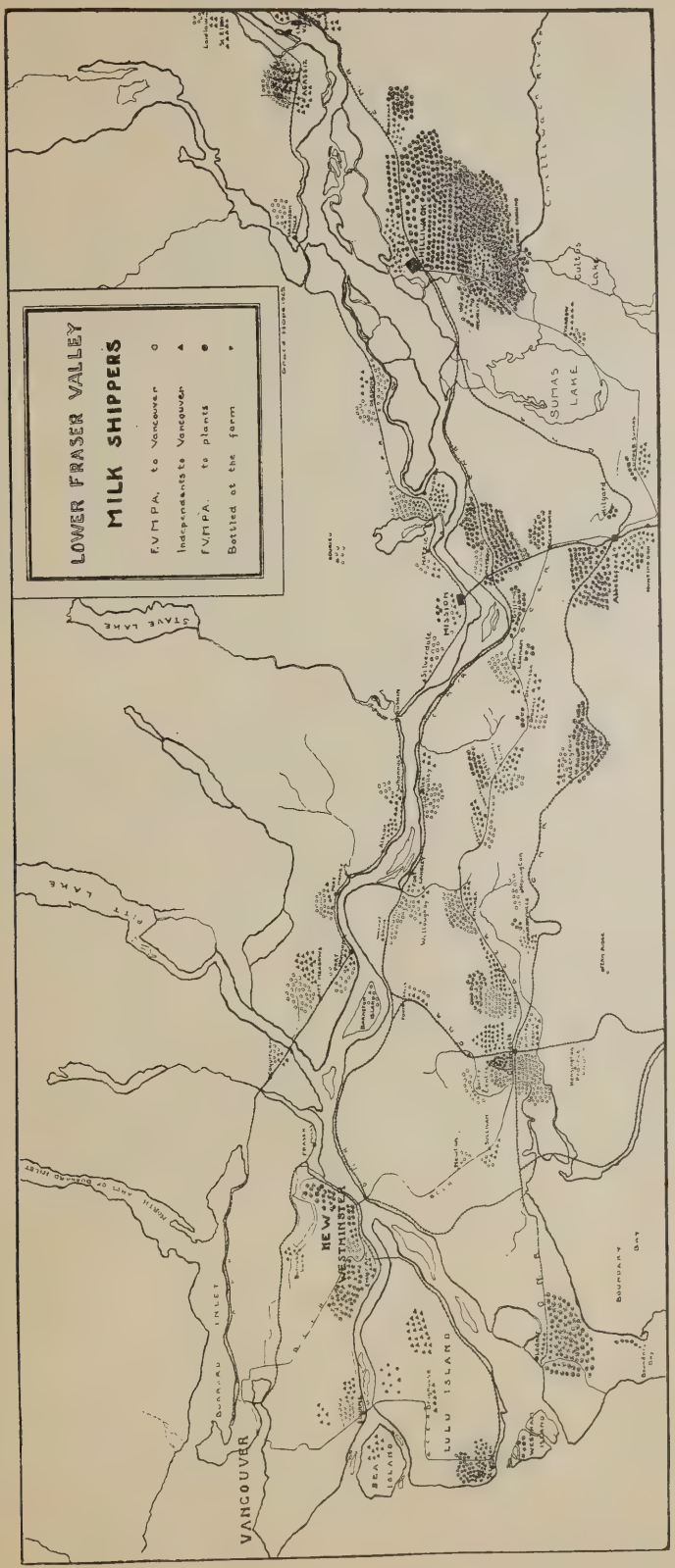
The map is designed to show the distribution in this area of the milk-producers, and of the cattle which supply milk either to Vancouver or other points or to manufacturing plants.

Thus, for each shipper at or about a given shipping-point is placed a sign; and the total signs therefore indicate the total shippers at or about that point. The grouping is not absolutely exact, as the space available on the map compared to the size of the signs did not permit of it. But the general result is approximately correct.

It may readily be seen that the most concentrated area of milk production on a large scale is about Chilliwack, the next consisting in the areas Matsqui-Abbotsford; the third in and about Cloverdale, with a number of others coming closely after these.

If, now, the signs indicating milk production be further considered, it will be seen that they are of four different forms—a plain circle, indicating shippers of milk to the Fraser Valley Milk Producers' Association for the fluid-milk market; a circle containing a star, indicating shippers of milk to the F.V.M.P.A. for the manufacture of dairy products; a solid black triangle, indicating shippers of milk to independent distributers for the fluid-milk market; and a plain star, indicating shippers of milk bottled on the farm (preferred raw milk), of whom some distribute themselves, while others ship to the Fraser Valley, and still others to independent distributers.

* Figures do not include raw-milk producer-distributers or small cow-owners.


LOWER FRASER VALLEY
MILK SHIPPERS
F.V.M.P.A. to Vancouver
Independents to Vancouver
F.V.M.P.A. to plants
Bottled at the farm
VANCOUVER
NEW WESTMINSTER
LULU ISLAND
SUMAS LAKE
STAVE LAKE
BOUNDARY BAY
BURRARD INLET
FRASER RIVER

It will be noticed that east of the Mission-Aldergrove line the valley south of the Fraser yields very little co-operative fluid milk, but a great deal of co-operative by-products milk. From this line west, and from the whole length of the valley north of the Fraser River, fluid milk constitutes the bulk shipped; and it is from these areas that the fluid milk of both co-operatives and independents is chiefly drawn. (*See* map, Lower Fraser Valley milk-shippers.)

119. FARMERS CHANGE TO DIFFERENT SHIPPERS.

There is some sour milk, a relatively small quantity, received by the distributers at all times of the year. This amount naturally increases during the months of highest temperature. Some of this milk has been consistently "turned down" or rejected for the fluid trade. "Turned down" milk is sold in the lower-priced channels and consequently the shipper becomes dissatisfied with the price. This has been a fruitful reason or excuse for a shipper to turn from one dairy to another—where he will not get turned down. The man may improve the quality of his product immediately the change is made to another dairy; but in the case of a dairy being short of milk the tendency is to let some of this inferior milk go by. This applies to tainted milk and milk turned down for some other reason, possibly dirt. The general practical grading of the bulk of the supply will have to be continued by the platform graders; but when a man's shipments are consistently not up to grade the quality should be checked by an impartial grader, and when found to be not up to standard the shipper should be given a limited time to improve, and if he fails in the attempt his supply should be rejected indefinitely. The urban health departments should be responsible for this. It should be made impossible for a shipper to turn from one distributer to another because his milk has been rejected. The product should be rejected completely until such time as improvement is made. The shipper at the same time must be given access to an impartial Government grader at low cost. The action of the Government grader should be final. A recommendation is made to this effect.

120. MILK-FAT AND SKIM: A SUGGESTED ADJUSTMENT.

A problem and to some degree a grievance of the shippers is the question of payment on the basis of the milk-fat content of the milk only. It can readily be seen that 4-per-cent. milk pays a lower freight rate per pound milk-fat contained in the can than 3-per-cent. milk, and that 4-per-cent. milk pays a higher rate per pound milk-fat than 5-per-cent. milk. Assuming that three 10-gallon cans of milk, one of 3 per cent., one of 4 per cent., and one of 5 per cent., were shipped from the same station at one time by three different shippers and all paid the same total freight, in the first case the freight would be deducted from the 3-lb. milk-fat, in the second case from the 4-lb. milk-fat, and in the last case from the 5-lb. milk-fat. This method of payment places a premium on high-testing milk. The milk in the can, other than the milk-fat; that is, the liquid and the solids not fat are on this basis of payment apparently given away, but freight is charged for delivery to the dairy. The Commission is not making a recommendation, but, for information, shippers and dealers, association members and others are referred to the schedule of "the 1929 Philadelphia Selling Plan." This plan provides for a sliding scale per hundredweight of milk, depending on the amount of milk-fat it contains. The scheme provides a suggested basis for discussion of the problem in British Columbia. The quotations are based on 3 per cent. milk-fat content of milk and a differential of 4 cents for each tenth point and 2 cents for each half-tenth point up and down, and are for all railroad points.

121. BASIC PRICE.

BASIC PRICE—JUNE, 1928.

(Page 5, *Milk Producers' Review.*)

F.O.B. PHILADELPHIA, GRADE B MARKET-MILK.

Test per Cent.	Per 100 Lb.	Price per Quart.	Test per Cent.	Per 100 Lb.	Price per Quart.
3.0	$3.29	7.1	4.05	$3.71	8.0
3.05	3.31	7.1	4.1	3.73	8.0
3.1	3.33	7.15	4.15	3.75	8.05
3.15	3.35	7.2	4.2	3.77	8.1
3.2	3.37	7.25	4.25	3.79	8.15
3.25	3.39	7.3	4.3	3.81	8.2
3.3	3.41	7.35	4.35	3.83	8.25
3.35	3.43	7.4	4.4	3.85	8.3
3.4	3.45	7.4	4.45	3.87	8.3
3.45	3.47	7.45	4.5	3.89	8.35
3.5	3.49	7.5	4.5	3.91	8.4
3.55	3.51	7.55	4.6	3.93	8.45
3.6	3.53	7.6	4.65	3.95	8.5
3.65	3.55	7.65	4.7	3.97	8.55
3.7	3.57	7.65	4.75	3.99	8.6
3.75	3.59	7.7	4.8	4.01	8.65
3.8	3.61	7.75	4.85	4.03	8.65
3.85	3.63	7.8	4.9	4.05	8.7
3.9	3.65	7.85	4.95	4.07	8.75
3.95	3.67	7.9	5.0	4.09	8.8
4.0	3.69	7.95			

When milk is not tested the price f.o.b. Philadelphia is 8 cents per quart.

Such a scheme considers milk as milk rather than a single part of milk—milk-fat only.

The suggestion is offered for consideration only, and in order that there may be some basis for discussion should the question be raised later. A somewhat similar schedule based on the percentage or quantity of milk-fat in the can might readily be worked out for this Province or the Lower Fraser Valley area. This method provides for the payment of milk as milk instead of for the milk-fat contained in it only. This, however, is a suggestion only. No recommendation is made with regard to it.

122. BASIC QUANTITY AND SURPLUS: AS RECOMMENDED.

Farmer A., a Co-operative Shipper to the F.V.M.P.A.—Let us assume that a man, Farmer A., produced 400 lb. of fat on an average per month during the months of October, November, December, January, February, and March. These are the six months of lowest average production and of highest average cost. It might be that on an average 300 lb. of this production were required for the fluid trade. The surplus of 100 lb., the amount over the fluid requirement, would have to be sold elsewhere. The 300 lb. for the fluid market would be paid for at the net settling rate f.o.b. Vancouver of the F.V.M.P.A. for milk sold wholesale and retail in the fluid market (including cream). *This would be considered the basic quantity and the basic price.* The 100 lb. surplus would be used in part for ice-cream, condensed milk, butter, and possibly other products, and would be paid for on the basis of the net price f.o.b. Vancouver received for these products. This would be considered the "surplus" quantity and would be paid for at the surplus price.

It might be possible to hold the absolute quantity throughout the year in so far as the fluid market was concerned, but in the event of any increase in the fluid trade during the summer months Farmer A. would not only hold his 300 lb. butter-fat, but also the same proportion, which would be something more than 300 lb. per month. In the event of a falling-off in the fluid trade during the summer, he would still be paid for the same proportion, but on the basis of something less than the 300 lb. that went into the fluid trade. He would hold his proportion, but the absolute quantity would be slightly more or less. In practice, the basic quantity should be

figured in such a way that the absolute quantity of Farmer A. as sold in the fluid market should not vary from period to period during the year. The variable quantity should be the surplus.

The summer months, April, May, June, July, August, and September, might be considered the months of highest production for quantity and of lowest cost per pound fat. At any rate, natural conditions make possible an increased production at less cost during these months. May and June especially show marked increases in production. *This extra production at low cost would be paid for at the price for surplus.*

For example, let us assume now that Famer A. has an average production of 600 lb. fat during the months of summer. Under the recommendations he would be entitled to participate in the price paid for the (1) basic quantity of 300 lb. and (2) surplus quantity of 300 lb. This would take care of all summer production at a somewhat lower price, and at the same time would permit the farmer to participate in the summer "basic quantity" price.

The summer "basic quantity" price would be the F.V.M.P.A. monthly settling rate for fluid product sold. The summer price for "basic quantity" milk would likely be somewhat less than the price of winter "basic quantity" milk because of the somewhat lower retail and wholesale prices. The surplus price would be the F.V.M.P.A. settling rate for all pooled products other than the fluid milk and cream.

Farmer B.—Farmer B. is shipping milk to an independent distributer. He would be paid on the same basis and at the same rate per pound butter-fat as the co-operative shipper—one price for his basic quantity and another price for his surplus, all f.o.b. Vancouver.

123. THE POOL IDEA IS RETAINED.

At first glance it might appear from the recommendations that the pool idea, which is the basis of the merchandising policies of most co-operatives, has not been maintained. Such, however, is not the case. At the same time there is a market difference between the pool idea as now practised by the Fraser Valley Milk Producers' Association and the pool idea as recommended. The pool idea as recommended contains two factors that are not now in practice.

(1.) (*a.*) All milk that is sold in the fluid market is pooled, and whether the farmer be a co-operative or independent shipper he receives the pool price fo his proportionate share of this market. (*b.*) In the same way all milk that is used in the products market is pooled, and the farmer, whether co-operative or independent, receives the pool products price for all of this, which is the surplus price.

(2.) The farmer is now offered more encouragement for uniform production for the fluid market, and he can at the same time produce as much milk as he chooses for manufacture into dairy products in the summer without in any way making his neighbour responsible for his surplus.

New Shippers.—It has been the policy of the Fraser Valley Milk Producers' Association in the past to accept all new members offering. A new member shipper, no matter how small, has found a ready market for his product through the channels of trade of the association. The new shipper has immediately been granted all the rights and privileges and accepted the same responsibilities as the old members. Many of these accounts are at first small and consequently are relatively expensive to handle.

There is nothing in the recommendations to indicate that all new farmers or shippers should not at once have their milk accepted by the distributer. It should be understood, however, that the new shipper cannot, under the principles of the recommendations laid down, participate at once in the price for basic-fluid quantity. In order to get his permit as a fluid-milk shipper he must first produce a product that meets the requirements of the regulations for quality, and in order to share in the price for a basic quantity he must first produce for the six winter months in order to have his basic quantity established. During this period of probation the milk received would be paid for at the price for milk products.

124. HOW BASIC QUANTITY SHALL BE DETERMINED.

The basic-fluid quantity of each farmer for the first year of the operation of the Committee of Direction shall be based on the shipments of that particular farmer made during the months of October, November, and December, 1927, and January, February, and March, 1928. For

following years the basic quantity shall be modified according to the increase or decrease in production during the previous six winter months, each man always receiving his fair share of the fluid market during the winter, and carrying this basic quantity into the six summer months. Each farmer's basic quantity for the succeeding year shall be apportioned annually on the basis of the total production of the previous winter. That is, a shipper in order to participate in a larger proportion of the fluid market in the winter of 1930–31 must have increased his total production during the previous winter, 1929–30. If his winter production decreases, the basic-fluid quantity for the following winter may decrease in like proportion.

125. WHAT WILL THE INDIVIDUAL FARMER GAIN FROM THE NEW POOL PRICES?

The individual farmer will gain (1) according to his ability to produce a quality of milk that meets the more stringent requirements of the regulations for fluid milk, and (2) according to his ability to maintain his winter production at a high level. No two farmers, even neighbours, may receive exactly the same price if the two pool prices are averaged. They will receive the same pool price per pound milk-fat for basic-quantity milk and the same pool price for surplus milk, but the average price per pound for each farmer may be different, depending on the relative amounts of basic-quantity milk and products or surplus milk which he produces.

Let us assume two farmers, A. and B., and assume that they are shipping certain quantities of milk.

Farmer A.—

Basic quantity, 300 lb. milk-fat at 80 cents	$240.00
Surplus quantity, 400 lb. milk-fat at 45 cents	180.00
For 700 lb. milk-fat he receives	$420.00
For 1 lb. milk-fat he receives	.60

Farmer B.—

Basic quantity, 200 lb. milk-fat at 80 cents	$160.00
Surplus quantity, 160 lb. milk-fat at 45 cents	72.00
For 360 lb. milk-fat he receives	$232.00
For 1 lb. milk-fat he receives	.644

In this assumed case the average price to the farmers differed by 4.4 cents, due to the differences in basic quantities and surpluses, but both farmers received the same price, which was a pool price for milk for the fluid market; and both farmers received the same price, which was the pool price for milk products made from the surplus milk.

126. HOW THE EQUALIZATION DUES MIGHT BE CALCULATED (IN THE DISTRIBUTING BUSINESS).

Let us assume that the Fraser Valley Milk Producers' Association sells 55 per cent. of its production in the products markets and 45 per cent. of its production in the fluid markets. Also let us assume an 80-cent per pound fat whole-milk price and a 40-cent per pound fat products price paid to the farmer f.o.b. Vancouver.

Let us assume a total production of 1,000 lb. milk-fat.

55 per cent. of 1,000=550 lb. milk-fat at 40 cents=	$220.00
45 per cent. of 1,000=450 lb. milk-fat at 80 cents=	360.00
1,000 lb. sell for	$580.00

The average pool price is therefore 58 cents a pound fat.

Let us now assume that the independent distributer buys 1,000 lb. of milk-fat from the country. Under the recommended arrangement he would pay the farmers $580 f.o.b. Vancouver for this, and divide the total up among the shippers according to the method of payment recommended elsewhere.

Let us now sell milk-fat for a competing dairy and assume that its efficiency is exactly the efficiency of the Fraser Valley Milk Producers' Association; no more efficient, no less efficient, and that it sells at the same prices as are recommended elsewhere.

Competitor A.—(Let us assume that this Dairy A sells 10 per cent. as products and 90 per cent. in fluid market.)

10 per cent. of 1,000=100 lb. milk-fat at 40 cents=	$40.00
90 per cent. of 1,000=900 lb. milk-fat at 80 cents=	720.00
It sells the total for	$760.00
It pays the farmer	580.00
It has a surplus of	$180.00

Therefore it could pay the Committee of Equalization a total of $180 or 18 cents a pound milk-fat on the total amount handled.

Competitor B.—(Let us assume that this Dairy B sells 20 per cent. as products and 80 per cent. in the fluid market.)

20 per cent. of 1,000=200 lb. milk-fat at 40 cents=$	80.00
80 per cent. of 1,000=800 lb. milk-fat at 80 cents=	640.00
It sells the total for	$720.00
It pays the farmer	580.00
It has a surplus of	$140.00

Therefore it could pay the Committee of Equalization a total of $140 or 14 cents a pound milk-fat on the total amount handled.

Competitor C.—(Let us assume that this Dairy C sells 40 per cent. as products and 60 per cent. in the fluid market.)

40 per cent. of 1,000=400 lb. milk-fat at 40 cents=	$160.00
60 per cent. of 1,000=600 lb. milk-fat at 80 cents=	480.00
It sells the total for	$640.00
It pays the farmer	580.00
It has a surplus of	$60.00

Therefore it could pay the Committee of Equalization a total of $60 or 6 cents a pound milk-fat on the total amount handled.

Competitor D.—(Let us assume that this Dairy D sells 65 per cent. as products and 35 per cent. in the fluid market.)

65 per cent. of 1,000=650 lb. milk-fat at 40 cents=	$260.00
35 per cent. of 1,000=350 lb. milk-fat at 80 cents=	280.00
It sells the total for	$540.00
It pays the farmer	580.00
It has a loss of	$40.00

Therefore it lost $40 and could not pay the Committee of Equalization anything. It would be well advised to get out of the fluid-milk and cream trade.

A study of these illustrations will show how important the fluid-milk market is to the various distributers and how important it is to sell as much of the fat as possible in this market. The illustrations indicate that one of the supposed dairies could pay the farmer a bonus of 18 cents a pound fat over the Fraser Valley Milk Producers' Association price and still make wages, salaries, interest, and profits; that is, assuming that they paid the same price and sold the milk-fat at the same prices as the F.V.M.P.A. and operated as efficiently and not more efficiently. Most of the independent distributers now operating pay the farmers a bonus of 7 cents; and take the necessary steps to find a whole-milk market for 80 to 92 per cent. of their product, the percentage going into the different markets varying, however, with the weeks and months of the year.

127. CAN THE FARMER BE PAID MORE PER POUND MILK-FAT?

It is obviously a fact that if the farmer is to be paid more money, some more money must be made available from somewhere with which to pay him.

It is the opinion of the Commission that no very large amount can be made available suddenly or even quickly. Undoubtedly, some gain to the individual farmer is to be made in reduction of production costs. This again is a slow process; labour costs are of some importance; feed costs especially, the costs of concentrates are an important item, and in the cost of concentrates the domestic freight rate on grain is of marked importance. Climate as indicated by wind, sunshine, and rainfall is a factor, but is beyond human control. The management factor alone is in his hands to a large degree, and even here, because of general discouragement, it is doubtful if he is managing and farming as well as he knows how. In many instances he is just carrying on and looking for relief from economic pressure by hoping to sell. He is hampered often by lack of working capital also.

It is felt that even a few cents increase in the price of milk-fat will have a varied influence on farming methods; possibly, at first, more psychologically than economically, even though a small increase will in many instances make the difference between profit and loss.

Extra money with which to increase the price per pound fat to the farmer may come from a number of sources: (1) Increased price to the consumer; (2) greater efficiency in the distributing system (not individual efficiency) and consequent reduction in total distributing costs; (3) the use of any excess profits of distributers as an equalization fund to be paid to the producer; (4) by reducing the spread between the producer and the consumer; or, in other words, more efficient operation on the part of the main distributer—the Fraser Valley Milk Producers' Association, which organization is being used as the base or standard in the recommendations contained herein.

Under the recommendations laid down the estimated increase per pound milk-fat to the farmer the first year is a material one after paying the expenses of the Committee of Direction.

The greatest savings are to be made, possibly, in more efficient distribution, amalgamation of companies, and the adjustment of routes and deliveries. Over a period of time the large-scale handling and more efficient delivery should reduce costs by about ½ cent or possibly much more on an average on every quart of milk handled. Such a saving—that is, ½ cent per quart—would advance the price to the farmer by about 2 cents or a little more per pound fat. Additional savings in delivery costs would advance the price to the farmer per pound fat proportionately.

The biggest factor of all in the price of fat is the price of butter in world markets; or really in Canadian markets. Every advance or fall in the price of butter is reflected in the price of fat to the farmer and especially in the price of surplus milk. Another important factor is the price of condensed milk and milk-powder in world markets. Local consumers can help materially by buying the brands of these commodities that are manufactured from British Columbia milk. The "Pacific" brand is wholly a British Columbia product. The Borden Milk Company also has a local plant. Both brands are on sale in the city.

The volume of dairy products produced in this valley is relatively small and consequently has little, if any, influence on world prices. On the other hand, Vancouver is a seaport and local products must compete with foreign products laid down at relatively low freight rates by water.

Because dairy-manufactured products are world commodities, no recommendations are made with regard to them except in so far as they enter into the "surplus" problem in the T.B. Free area around Vancouver and adjoining municipalities. No Committee of Direction can under present competitive conditions have any influence on the price of dairy products in world markets.

The above figures with regard to increased price to the farmer deal with all the farmers as a whole or deal with the total extra amount of money that might be available for them. They do not refer to the increases to any individual farmer. That is another matter depending on the quality of his production and his ability to maintain winter production.

128. DELIVERY COSTS.

In our opinion a great deal yet remains to be done on the part of the farmer in improving his production methods and consequently getting his production costs lower than the sale price.

It cannot be said, however, that he is relatively inefficient, even though his returns are relatively low. In our opinion the sales system under which he operates and under which he sells his product is more inefficient. Some individuals, individual companies, and co-operative associations within this system of distributon are in themselves efficent, but the system itself is very inefficient. Distributing costs are as varied as individual production costs. As many as five wagons deliver bottled milk on one street in some sections of the city. Special inducements are offered to patrons of one company, which "service" must in turn be met by a competing company. Prices are sometimes cut by one company and met by another company, in which case the consumer gains temporarily, and may continue to do so until a marked shortage of supply makes a higher price necessary in order to call forth an increasing supply.

Retail house-to-house delivery costs are about 5 cents a quart; some individual costs are higher; a few are lower. The lowest distributing cost of which we have any record outside of Vancouver is in an Eastern city, where the cost in 1922 was 3.8 cents, in 1923 it was 3.8 cents, and in 1924 it was 3.9 cents per quart. One other Eastern city has a distributing cost of from 7.16 cents to 7.72 cents for the same period and another city from 6.3 cents to 6.4 cents for the same period. Both these latter cities have a retail milk price to the householder about 2 cents above Vancouver price. These figures are quoted only to show the great variation in "delivery spreads."

Figures submitted by one retail distributing company in Vancouver indicate that its distributing cost (figured as from the time the milk is received at the receiving-platform of the dairy till the consumer gets it) is in the neighbourhood of 3 cents a quart. Should it be possible to reduce the average cost of distribution to this amount per quart, it would be possible to pay the farmer an advance of at least 7 cents a pound milk-fat from a saving in delivery costs alone.

129. WILL THE INDEPENDENT SHIPPER HAVE THE TOTAL OF HIS ADJUSTMENT DUES RETURNED?

The statement is made elsewhere that it is considered advisable to bring the recommendations into effect gradually and to build up from conditions as they exist to-day. The price clause in the contract of the independent shipper is based on the monthly settling rate of the Fraser Valley Milk Producers' Association. The independent shipper receives a price above this settling rate, or, stated in another way, if the settling rate to the F.V.M.P.A. can be raised by 1, 2, 3, or more cents, the settling rate of the independent shipper is automatically raised by that much also. In this it is felt that the independent shipper will have returned to him a material increase per pound milk-fat the first year and something in addition, because of a return of a proportion of the equalization adjustments that he is required to pay. It is expected that he will not be penalized by reason of the operation of the Committee of Direction, but will be benefited to the extent of his proportion of the equalization adjustment. The indirect increases in payments to the independent shippers will depend on the increasing settling rates of the F.V.M.P.A., and these increasing settling rates in turn will depend on the improved conditions in the distributing end of the business. Three years of operations should bring the Fraser Valley Milk Producers' Association members up to the equal in price of the independent shippers and in the meantime the price to the independent shipper should have been advanced to some degree.

In writing thus, it is understood that the increase in price to the F.V.M.P.A. members to bring them up to the equal of the independent shippers would be due to improvements in operating and distributing efficiency. The absolute price might be higher or lower, due to world conditions, over which one small section of the country has little or no control.

To accomplish this—that is, price equalization—without imposing an undue hardship on any one, the whole scheme involves savings in handling and distributing costs plus increased revenues from various sources up to a total of approximately $400,000 the fourth year of the operation of the Committee of Direction. The size of the business at the present time is about $6,000,000. Less than 3 per cent. advance per year on the present price per pound fat to the Fraser Valley Milk Producers' Association shipper f.o.b. Vancouver will not only equalize prices to all, but add something to the price per pound fat being paid to the independent shippers as well. It is the belief of the Commission that this can be done.

130. MERGER OR COMBINATION.

An excerpt from "Production Economics," by Black, Harvard University (United States), states: "There are two opinions prevalent in the country with respect to the proper method of dealing with combination. One has been that the best policy has been to restrict it wherever possible and attempt to restore competition. . . . The other point of view has been that combination represents economic progress and should be permitted, but regulated. . . . This latter point of view is surely coming to prevail. Combination is proceeding at a very rapid rate. There seems little doubt, however, that the power of the Government will have to be strengthened to cope with it. Granted that any combination has power to control prices, the next step must be public regulation of prices. That step already needs to be taken in more cases than many people suppose."

The Commission does not look with disfavour on a merger or combination of distributing interests that would unite the larger distributing companies now engaged solely in the milk business, and some of the smaller distributing companies into two or three large and efficiently managed corporations or associations under such rules and regulations as would reduce distributing costs and give adequate protection to the milk-producer and the consumer. Such a combination, with proper public safeguards, would in our opinion reduce distributing costs very materially, improve the quality of some of the product, and by the use of newer machinery make the product safer.

We are recommending a middle course: the retention of the advantages of competition and at the same time the regulation of the prices in such a way that a plentiful supply will be assured for a long time to come—and the consumer will not be penalized by markedly increased prices. The tendency is toward combination and the public regulation of prices.

131. AMALGAMATION ON BASIS OF SOURCE OF MILK-SUPPLY.

There are three distinct groups in the large commercial field of milk distribution: (1) The co-operative distributers; (2) the independent distributers who buy from the country; (3) the independent distributers who buy all or part of their supply from wholesale dealers. (Producer-distributers make a fourth group, but are relatively unimportant in percentage of total milk distributed.) It is very important that the channels of trade be not suddenly seriously disrupted; and as nearly as possible that those who are getting a grade or quality of milk that is satisfactory should be permitted to continue to do so, or at least be given the opportunity to obtain a better quality. With this in mind, in any amalgamation that may take place the wholesale distributer should be given an opportunity to take over by purchase or combination all or any plant or plants to which he is supplying milk for bottling and retail distribution. Also those plants that are buying direct from the country might readily consider an amalgamation along similar lines. Such an arrangement would make a division into two groups based on the source of the milk they receive rather than on the type of business now carried on.

In this connection it should be pointed out again and clearly understood: (1) That some of the smaller dairies operating have not the most modern machinery and consequently, for safety's sake, should be dismantled; (2) that one or two of the more modern plants now in existence, by the addition of machinery, can take care of the whole of the preparations and bottling; and (3) that the surplus product now going into modern well-equipped products plants for manufacture into condensed milk, butter, and other products should not quickly be drawn away. No new products plants are necessary for economical and efficient service at the present time. Production, it is hoped, will materially increase, and, it is hoped, will increase somewhat faster proportionately than the city grows in population. The trade of both groups, co-operative and independent, possibly would be extended in the whole-milk and cream trade as the city grows. In order, then, to create a greater surplus for the manufacture of dairy products to supply the home market, production must increase more rapidly proportionately than the demand for fluid milk. It is only when this surplus has outgrown the present products plants that further plants should be constructed and equipped. No new buildings and but little new machinery are essential to the fluid trade.

132. RETAIL PRICES OF FAT IN MILK.

The following figures illustrate the price per pound fat the consumer pays when he buys milk containing a certain percentage of fat at a stated price per quart or gallon:—

Percentage Milk-fat in Milk.	Price, Qts. per Dollar.	Price per Lb. Milk-fat, 10.32 Lb. per Gal.
3.3	8	1.47
3.3	9	1.31
3.5	8	1.38
3.5	9	1.23
4.0	8	1.21
4.0	7	1.38
4.0	6	1.62
4.25	8	1.14
4.25	7	1.30
5.0	7	1.11
5.0	6	1.29

WHOLESALE PRICES OF MILK.

Percentage Milk-fat in Milk.	Price per Gal.	Price per Lb. Milk-fat, 10.32 Lb. per Gal.
	Cents.	
3.5	20	0.554
	22	0.609
	24	0.665
	26	0.720
	28	0.775
	30	0.831
	32	0.886
	33	0.914
	34	0.942
	35	0.969

RETAIL PRICE OF CREAM.

Percentage Milk-fat.	Price per ½ Pt.	Price per Lb. Milk-fat.
	Cents.	
18	20	1.78
30	30	1.60

WHOLESALE PRICE OF CREAM.

Percentage Milk-fat.	Price per Gal.	Price per Lb. Milk-fat.
18	2.10	1.17
30	3.20	1.07

133. COMPARATIVE MILK-FAT PRODUCTION COSTS IN BRITISH COLUMBIA, THE PRAIRIE PROVINCES, AND EASTERN CANADA.

No accurate figures are available on production costs in the Fraser Valley as compared to other parts of Canada. Information is available from only two sources, the evidence of an

official of the Department of Agriculture, Victoria, and a statement of a member of the Department of Animal Husbandry of the University of British Columbia. This information indicates that production costs in this valley are as high, and possibly somewhat higher than on the Prairies and in Ontario. Since there is no evidence to indicate that production costs are lower, any improvement in price to the consumer that will be high enough to encourage a steadily increasing supply will have to come out of lower distributing costs. Production costs in Canada and in this valley may be reduced materially due to greater efficiency on the part of the farmer, but relatively they will retain about the same position. On this basis it is not expected that milk prices in Vancouver can long remain below the average prices of other sections of Canada.

134. THE PRICE TO THE FARMER (A GENERAL STATEMENT).

We are very definite in our belief that the farmers are not getting enough for their product. This belief has been made clear and driven home a number of times in the evidence and from the examination of statements submitted. We are also convinced that the consumer should not be made to pay a price above the prevailing Canadian price or prices in other equally important Canadian cities for a product of equal quality. The present low price may seem high to many. As compared to other Canadian cities it is relatively low. Where, then, is the money to come from if the producer is to be paid more? It obviously must come chiefly from improved efficiency in handling and distributing costs, and possibly in addition from an advanced winter price to the consumers and to some degree from a stabilization of price in the wholesale business. The farmer also might improve his position by making an effort to reduce his production costs.

135. SUGGESTED PRICES—TO THE CONSUMER.

The following prices are given as an illustration of what is meant by price-fixing in such a way that competition will still prevail—the competition is within a milk-fat range.

The suggested summer prices to the consumer for fluid milk in bottles are as follows:—

Not less than 3.25 per cent. fat and not more than 3.6 per cent. at 9 quarts for $1.
Not less than 3.6 per cent. fat and not more than 4.25 per cent. at 8 quarts for $1.
Not less than 4.25 per cent. fat and not more than 5 per cent. at 7 quarts for $1.

The suggested winter prices to the consumer for fluid milk in bottles are as follows:—

Not less than 3.25 per cent. fat and not more than 3.6 per cent. at 8 quarts for $1.
Not less than 3.6 per cent. fat and not more than 4.25 per cent. at 7 quarts for $1.
Not less than 4.25 per cent. fat and not more than 5 per cent. at 6 quarts for $1.

The Summer Prices.—(1.) Not less than 3.25 per cent. fat nor more than 3.6 per cent. to be sold at not less than 9 quarts for $1. This will take care of a very large proportion of the bottle trade and will permit of competition within the milk-fat range. The tendency would be, however, for competition to hold the milk-fat content at just below 3.6 per cent.

(2.) Not less than 3.6 per cent. nor more than 4.25 per cent. fat at 8 quarts for $1. This would take care of a fair proportion of the trade and would permit of an opportunity to popularize special brands. Some special brands containing not over 4.25 per cent. fat might even be sold for 7 quarts for $1 or even 6 quarts for $1, but the competition for the sale of milk-fat would be held to between the 3.6-per-cent. and the 4.25-per-cent. range.

(3.) Not less than 4.25 per cent. nor more than 5 per cent. fat at 7 quarts for $1. This range would permit of competition on the part of the breed associations. If there is any special merit—and there may be—in Ayrshire milk, or Jersey milk, or Holstein milk, or Guernsey milk, or any other special brand of milk, an opportunity can be given to advertise it and popularize it. There is plenty of opportunity to compete on a service basis and to cater to any special class of trade without demoralizing the whole milk business by the salesmen talking "cream-line" to the detriment of other equally important qualities of the milk.

The customer in any case would be well advised to examine the cap on the bottle. The contents of the bottle must legally conform to the description on the cap. Prices for milk of higher milk-fat content than here referred to can readily be arranged and prices per gallon can be adjusted in a somewhat similar manner, also prices for cream.

136. MILK PRICES IN CITIES.

(From the Report of the City Department of Health, Winnipeg.)

Last year we quoted the retail milk prices pertaining to a number of Canadian and American cities and we are giving similar information for the year 1927.

1927 PRICES OF PASTEURIZED MILK FOR 17 CANADIAN CITIES, DELIVERED BOTTLED TO THE CONSUMER, PER 40-OZ. QUART.

	March.	June.	Sept.	Dec.
	Cents.	Cents.	Cents.	Cents.
Victoria, B.C.	14	12½	12½	14
Vancouver, B.C.	13	11	11	11
Calgary, Alta.	12	11	11	12
Edmonton, Alta.	12½	10	11	12½
Saskatoon, Sask.	12	13	13	13
Regina, Sask.	13	12½	12½	12½
Winnipeg, Man.	12	12	12	13
Fort William, Ont.	14¼	12½	12½	14¼
London, Ont.	10	10	10	11
Hamilton, Ont.	13	12	12	13
Brantford, Ont.	11½	11½	11½	11½
Toronto, Ont.	14	13	14	14
Ottawa, Ont.	11	10	10	12
Montreal, P.Q.	14	12	12	14
Sherbrooke, P.Q.	10	10	12	12
Halifax, N.S.	14	14	14	12
St. John, N.B.	14	14	14	14

1927 PRICES OF PASTEURIZED MILK FOR 24 UNITED STATES CITIES, DELIVERED BOTTLED TO THE CONSUMER, PER 32-OZ. QUART.

	March.	June.	Sept.	Dec.
	Cents.	Cents.	Cents.	Cents.
Birmingham, Ala.	17	17	17	17
San Francisco, Cal.	14	14	14	14
Denver, Colo.	12	12	12	....
Hartford, Conn.	16	16	16	16
Washington, D.C.	15	15	15	15
Miami, Fla.	25	22	22	20
Chicago, Ill.	14	14	14	14
Indianapolis, Ind.	12	12	12	12
New Orleans, La.	14	14	14	14
Baltimore, Md.	14	14	14	14
Boston, Mass.	14	14	15½	16½
Detroit, Mich.	14	14	13½	14
Minneapolis, Minn.	11	11	11	12
St. Louis, Mo.	13	13	13	13
Atlantic City, N.J.	15	15	15	15
New York, N.Y.	15	15	15	16
Cincinnatti, Ohio	14	14	14	14
Portland, Ore.	12	12	12	....
Pittsburgh, Pa.	15	14	14	15
Newport, R.I.	15	15	15	15½
Salt Lake City, Utah	10	....	11	11
Richmond, Va.	14	14	14	14
Tacoma, Wash.	10	10	....	12½
Milwaukee, Wis.	11	11	11	11

In quoting milk prices as paid by the consumer, pasteurized milk in bottles is considered the basic class of milk, because the greater portion of the milk-supply of all large cities and the entire supply of the majority quoted is pasteurized and delivered to the consumer in bottles.

137. POSSIBLE FUTURE SHORTAGE OF FLUID-MILK SUPPLY.

It is not without some concern that the Commissioners have considered the possibility of a shortage in the fluid-milk supply of Vancouver at some future date.

Although figures already quoted (paragraph 108) show a progressive and marked increase in the total milk production year by year from 1917 to date, yet this general annual advance

shows regressions in total production at shorter intervals, notably occurring practically every year at some time during the period, August to December. Ordinarily this regression is not extensive enough to affect the fluid-milk market. In 1927 this falling-off was progressive from August to December, reaching its low mark in the latter month. In 1928 in the corresponding period the shortage in production was so considerable that the fluid-milk market was affected to the extent that foreign milk (from the United States) was actually drawn upon to supplement the locally available fluid-supply. How could a fluid-market shortage exist in face of an excess total production?

It is true that the total production was, despite the shortage, greatly in excess of the total fluid-market requirement, as has long been the case in this part of the Province; but during the previous years the constant existence of this excess has made necessary the development on a large scale of manufacturing and building-up of domestic and foreign markets for these manufactured products. Contracts with these markets had been made early in the year (1928) for the products to be manufactured later from the usually abundant summer production. To fulfil these commitments was a necessity, for the markets, once secured with great pains, could not lightly be sacrificed, perhaps permanently lost, through failure to live up to the contracts.

Thus it came about that when the unusual shortage in total production of the latter half of 1928 developed, the fluid-milk shortage could not be remedied from the still existing fluid-milk excess because it already had been allocated to the manufacturing plants.

True, it worked out that, so far as the co-operative association was concerned, the shortage in total production was insufficient to create an actual shortage either in their own fluid market or in those commitments made to foreign markets; but it was great enough to prevent any leeway beyond the absolute requirements of these two. The independent distributers felt the shortage also, and having less surplus proportionately for manufacturing purposes, had less also to fall back upon for diversion to their fluid markets, they were actually short in their fluid-supply. At first they turned, as was their wont, to the co-operatives for relief, but the co-operatives had, as above described, only barely enough for themselves, and one independent was forced to bring in milk from extraneous sources.

Is this situation likely to recur? To answer this question it is necessary to analyse the factors of the 1928 shortage in total production, since this, while not the sole factor, was the basic factor in the fluid-milk shortage.

Inquiry and deduction seem to show that the shortage in total production of the latter half of 1928 was due in the main to the very dry summer immediately preceding, reducing pasturage. To this probably may be added an observed reduction in the number of cows freshening in the early fall and a reduction also in the production of milk per cow. Possibly low prices for milk-fat (55 to 62 cents per pound), high prices of feed, and a general feeling of discouragement amongst the farmers may have prescribed to some neglect of proper supplementary feeding for milk production. Certainly the shortage occurred amongst co-operative farmers and independents alike, and the remedies suggested must apply to both.

No one can urge that commitments to foreign markets can be defaulted successfully, nor can they be made good successfully by expensive purchases for replacements of short supplies.

Only by encouraging total production up to or in excess of total demands can the future be ensured; and these demands both fluid market and by-product market demands will unquestionably increase as local population increases and foreign markets expand.

The recommendations, elsewhere made in detail, aim to secure this very development. The recommendations, together with the equalization of production, are based not only on increase but also on equalization of winter and summer production, to equalize the flow of milk for manufacture and therefore its economical handling, as well as to secure a stable and abundant fluid-milk supply. Through equalization of prices for the same grade and quality they aim to encourage the farmer by rewarding him for increased attention to and greater foresight in his operations; and, since these apply to co-operative farmers and independent farmers alike, they tend to ensure to the co-operative distributer and the independent distributer alike dependable sources of abundant supply. The shortage of 1928 above described disclosed that the bearing of the burden of surplus by the co-operatives chiefly has one redeeming feature at least, for it gave to the co-operatives an invaluable resource in time of shortage. The independents, being relatively free of the burden of the surplus in times of abundance, were also relatively bereft of its advantages as a resource in times of shortage. Now the independents become in accordance

with the recommendations sharers in the manufactures, they should also in accordance with the recommendations be sharers in the rewards of manufacturing; they should be guaranteed a full supply of fluid milk in proportion to their respective markets.

138. THE PRINCIPLE OF COMPETITION IS ADHERED TO.

The recommendations do not contain anything that indicates or infers that any one now engaged in the business of milk distribution or milk production and distribution should be forced out of this business. With the gradual bringing into force of the recommendations, it is possible for all exercising a reasonable degree of efficiency in management to continue. At the same time, it is felt, some small distributers would be well advised to cast in their lot with the large distributing companies either by amalgamation or sale. In the interest of efficiency, it is felt that no licences should be issued to possible new retail distributers without very careful consideration with regard to their effect on costs. Such action over a period of months should result in about two, possibly three, fairly large distributers and a number of farmer-producers vending milk in the city. The recommendation for amalgamation is made in the interests of economy in handling and in distribution. Under the recommendations all have a chance to operate in the future as now. Their business-life will depend on their efficiency as compared to that of the Fraser Valley Milk Producers' Association.

The Fraser Valley Milk Producers' Association sells milk and milk products, pays wages and salaries, pays interest at 7 per cent. on the bonds and interest at 8 per cent. on the stock of the company. It pays all other expenses common to a well-managed business, and then pays to the farmer-producer what is left out of the moneys received for his milk and the products manufactured from it.

The recommendations ask that the independent buyer pay the independent shipper the same price for the same grade and quality of milk at the same time of the year as the F.V.M.P.A. members receive. The recommendations also ask that the milk-fat be sold not below a certain price per pound to the consumer. If by virtue of some special quality the milk-fat is sold for a higher price, no exception is taken. The prices suggested to the consuming public are below the average of Canadian cities and very much below the average prices in American cities. The two end prices are fixed—the first, the sale price to the consumer by the Committee of Direction, and the second, the price to the farmers by the settling rate of the Fraser Valley Milk Producers' Association. This latter rate may vary from month to month, the former only with the summer and winter seasons. This all permits the independent distributer to pay wages and management, all other expenses, and 7 or 8 per cent. interest on the investment. If the independent distributer is more efficient in his operations than the farmers themselves as represented by the F.V.M.P.A., he will make some profits. If he is less efficient he will lose all or part of his interest, and if he is very inefficient as compared to the Farmers' Association he will eventually fail.

139. RELATION OF GOVERNMENT TO MARKETING.

As previously stated, milk in all its aspects can be considered a public utility. Because this is so it might readily be argued that the city or the metropolitan area should enter into the business of receiving, pasteurizing, bottling, and distributing milk and cream. Excellent precedents are found for such arguments in the methods of handling water and sewage problems by the present Water and Sewerage Boards of Greater Vancouver. Some arguments have been advanced in favour of such action.

The Commission is of opinion, however, that no such action should be taken at the present time. The existing private and co-operative plants are giving fair service and it is possible for them to render excellent service. The Commission holds that it is more the place of the Government and municipality to act as impartial referees in the game of milk production and distribution as it is being played by private enterprise. It is necessary that the game of milk production and distribution be played, and in order to meet with general public approval it must be played well and according to the rules laid down. The municipalities must be assured of a plentiful supply of the right quality of milk at all times. The farmer-producers by consent have permitted themselves to be included in a T.B. Free area under the inspection of the Dominion Government. The consent of two-thirds of the dairy-farmers in the area was necessary before the T.B. Free area could be established. Law and regulation provide for the Provincial Government inspection of farms producing fluid milk. The Medical Health Officers of the municipalities have authority to inspect any or all farms shipping milk for human consumption. These all

seem to be rules of the game laid down for the protection of the players and the patrons. In the light of modern experience other rules and regulations might readily be made. Some of them might be rules and regulations for the encouragement of the farmers, as well as acting as restraints on their freedom of action, and at the same time be in the interest of the public as a whole.

In the light of modern experience it has undoubtedly been necessary to modify traffic rules and regulations. Generally speaking, traffic has changed, and rules and regulations have been made, and will continue to be made, to protect the public as a whole. Undoubtedly, also, some restraint is placed on the individual who is held at the street-crossing awaiting favourable traffic signals, or who is not allowed to drive on the left side of the road, or who is allowed to go "one way" only on certain thoroughfares. The restraints possibly affect every one adversely at times, but the net total result is very much to the common good.

Nor is it true that rules and regulations made to-day may be effective in their results to-morrow. As traffic changes, the rules governing its management must change.

The Government and the municipalities might readily attempt the regulation of individuals in the interest of the common good, offer encouragement to initiative and constructive industry, lay down the new rules of the game of marketing, and enforce them. We are not, however, of the opinion that the Government or the municipalities should play the game of milk production or enter into the distributing business at the present time. We feel rather that they should continue to make rules and regulations according to the requirements of the case, act as referee, and enforce the rules they have made.

An excerpt from "Public Regulations of Competitive Practices," National Industrial Conference Board (United States), reads: "The competitive system involves, it is manifest, the grant of a wide discretion to individuals to enrich themselves by whatever methods they can. But that a wide latitude in the choice of pathways to gain may result in the discovery that there are numerous ways by which one may profit at the expense of others, rather than along with them, has long been realized. As a consequence, not even under the roseate illusions of the eighteenth century political philosophy did the Government of any modern State, save for a brief period in France during the Revolution, abandon all regulation of the conduct of economic affairs. It has always been recognized that some authoritative restraints must be imposed upon men, in trade no less than elsewhere, *if their intercourse is not to degenerate into a hectic process of mutual frustration.*" (The italics are ours and are used because they sum up the milk situation very well. The relationships of distributers here seem to have developed into deliberate attempts at "mutual frustration.")

140. A COMMITTEE OF DIRECTION.

The Commission recognizes the principle of a Committee of Direction whose duties and responsibilities shall be defined in any legislation that is passed based on these recommendations.

141. FINANCING THE COMMITTEE OF DIRECTION.

It is estimated that the cost of financing the Committee of Direction should not exceed ½ cent a pound milk-fat for ordinary expenditure in any one year. The cost for ordinary expenditure might readily be somewhat less than this amount.

142. AN ADVISORY COMMITTEE.

It is also suggested that provision be made for the appointment of an advisory committee, the members of which shall serve without pay. This committee would be called together monthly, and at such other times as required, to discuss consumption, distribution, price, health, and other problems as they arise from time to time. The advisory committee might be made up of representatives from the City Councils of Vancouver and New Westminster, these being consumer representatives, two independent distributers, two representatives from co-operative distributers, two farmer-producers, one representative from the "preferred raw" distributers, health officials, and such others as from time to time might be considered advisable. The actions of this committee would not be considered binding on the Committee of Direction, but would be for its direction and guidance. Right of appeal on the part of this committee or any group of this committee direct to the Executive Council should be made possible.

Right of appeal from the decision of the Committee of Direction must be made possible. The recommendation presupposes that both the producing and the distributing interests will work

in co-operation with the Committee of Direction and keep it advised of changes in the health and economic situations. The advisory committee, being made up of divergent interests, might readily fail to reach an unanimous decision at times. Some interest, large or small, may feel that it has not received due consideration and consequently must have right of appeal also.

We feel that the advisory committee as constituted in the recommendations will provide not only the necessary safeguards, but all the safeguards required.

143. THE ACT FOR THE RELIEF OF DAIRY-FARMERS.

The proposed Bill entitled "An Act for the Relief of Dairy-farmers," the discussion of which by the Select Standing Committee on Agriculture in the Provincial Legislature in March, 1928, led to the appointment of this Commission, is very largely a producers' measure. It was supported in the main by co-operative producer-shipper-distributers and was opposed generally by independent producers and distributers. From a general point of view the Act provided for a Committee of Equalization, the chief duty of which would have been to equalize the prices paid to the farmers by ways and means therein provided. It aimed to put both the co-operative producer and the independent producer on an equal basis with regard to the price received for equal grade and quality per pound milk-fat and to allot to each his proportionate share of the various markets.

The recommendations as made herein deal with distributer and consumer problems as well as producer problems. An effort has been made to protect the consumer on price and to limit the spread between consumer and producer to the cost spread as indicated by the distributing costs of the Fraser Valley Milk Producers' Association.

A title such as the following would seem to be more adequate: "An Act for Safeguarding the Production, Distribution, and Sale of the Milk-supply of Vancouver and Adjoining Municipalities."

The recommendations with regard to the equalization principle differ from the original, in that the equalization principle will be applied gradually and in such a way that complete equalization will not take place until after the end of the third year.

144. PRECEDENTS FOR SIMILAR RECOMMENDATIONS.

We are not aware of any place in America or elsewhere where regulations such as we are recommending are in force. Nor are we aware of any place anywhere in which conditions are similar to the situation as it now exists in the Lower Fraser Valley and in Vancouver. We have tried to borrow the best that is offered elsewhere, but, being fully aware that the situation here is different, we could recommend the rules and regulations of others only in part. The fact that land-clearing and drainage (Sumas) are relatively expensive precludes any very rapid extension of the producing area. The mountains limit the immediate potential productive area on three sides and the International Boundary marks the fourth side. We do not face the immediate prospect of any large part of the fluid-supply coming from outside of the Lower Valley because no very large oversupply is produced anywhere near. We also have a T.B. Free area. Consequently, it is possible with some degree of certainty to define the boundaries of the milk-shed of Vancouver and adjoining municipalities. At the same time we have not made it impossible for a new shed to be opened: if anything, the recommendations offer some encouragement to other and newer districts. The recommendations as made are based on the practical considerations as we see them in this community. And the recommendations are made only for the two commodities, milk and cream, produced in the milk-shed of and sold in this metropolitan area. The recommendations are made specifically for the improvement of the milk- and cream-fluid trade and may or may not be applicable to any other commodity.

The recommendations made may seem drastic, but we hold that they are not any more drastic than the present situation demands. The health factors, the distribution cost, the price to the consumer, and the price that the farmer receives are all important factors in the situation. The growth of the metropolitan area, the health of the community, and the encouragement of the producer cannot be lost sight of. The recommendations are made in the interest of the public as a whole.

145. PROTECTION AND ENCOURAGEMENT.

It is the desire of the Commission to ensure the consumer the greatest possible protection both in the quality of the product and the price he shall be required to pay. It is our desire also

to offer some encouragement in the nature of an increased price to the farmer who is being required to meet more stringent regulations with regard to quality. In offering the protection referred to above, it is not forgotten that a large amount of capital is invested in the distributing business, that large numbers of men are employed, and that a great many families are dependent on this business for a living. Nor is it forgotten that the $26,000,000 invested in the dairy business in the Fraser Valley is several times greater than the investments in the distributing business, and that some thousands of families on the farms are dependent on the sale of milk and milk products for a living. These latter, in our opinion, must be protected and encouraged to a somewhat greater degree than the other groups if the industry is to continue to show a healthy growth and progress. We believe it can be done without working a serious hardship on any one if the recommendations are carried out in full.

146. MAKE PROGRESS SLOWLY.

The situation as it now exists in the milk business seems to have just grown up. In many respects the metropolitan area is still in the small-town stage in so far as distribution and health regulations in relation to milk are concerned. Vancouver City alone of all the municipalities seems to have fully recognized its health responsibilities. Some other municipalities have recognized theirs in part and one other is making rapid progress. Amalgamation has already taken place as far as two municipalities and Vancouver are concerned, but for the purposes of a fluid-milk supply we are of opinion that all territory included in Vancouver, Burnaby, and New Westminster should be considered as one metropolitan area, and dealt with as such under the one Committee of Direction. The Health Officers of all municipalities working in co-operation with the Health Officers of Vancouver by arrangement would improve the efficiency and reduce the total cost.

Population within this area is increasing rapidly and we would be remiss in our duty if we did not suggest plans for the near future as well as for the present. It is felt that now is the time to formulate plans and policies for the future as well as for the present, and make them on such a scale that the situation will be adequately met as the population grows.

Consequently, the proposed regulations should be brought into operation gradually; possibly over a period of not only some months, but a maximum of three years, depending on and dealing with each situation as it arises. The start, however, should be made at once on both the health and economic aspects by amendments to existing laws and by the placing of new laws on the statute-books.

147. THE RECOMMENDATIONS ARE INTERLOCKED.

The recommendations are numbered and in part each one deals with a separate matter. It is nevertheless true, however, that each separate recommendation plays a part in a general scheme of things and the failure to take cognizance of a recommendation may consequently nullify some other recommendation. For instance, certain recommendations are made with regard to the basis of payment to farmers in order to encourage quality and uniformity in production. This recommendation is closely tied to the general recommendations with regard to wholesale and retail prices in the city. It is also closely tied to the general recommendation with regard to equal price f.o.b. Vancouver for equal grade and quality. The general effect of the recommendations as a whole might readily be very materially modified should action be taken on certain specific recommendations only. It is to guard against such a possibility that this paragraph is written. The problem must be dealt with as a whole.

148. WRITTEN ARGUMENTS.

During the hearing of the evidence and again later, interested parties were not only given an opportunity but were requested to prepare written arguments for the consideration of the Commission. In all, nine arguments were submitted dealing with various aspects of the milk industry and offering suggestions for the improvement of the situation. All of these arguments have been given consideration and have been of material help to the Commission. The arguments of the Medical Health Officer of Vancouver, the Fraser Valley Milk Producers' Association, and of one private citizen were very comprehensive, and as a supplement to the evidence and other documents submitted have been of great assistance.

The independent distributers when asked in the witness-box offered suggestions and made some recommendations, *but did not submit a written argument.*

149. SHOULD THE RECOMMENDATIONS BE ENACTED INTO LAW?

Some of the witnesses were opposed to any form of legislation in relation to the problem. Others felt that the only solution lay in legislation. A number of times it was suggested to the Commission that it would be possible to arrive at an understanding by holding a round-table conference. A solution by such simple means does not appear to be likely, and consequently we are recommending that the principles as laid down be enacted into law.

150. ELEVATOR SCREENINGS.

October 9th, 1928.

The Honourable S. F. Tolmie,
Premier of British Columbia,
Parliament Buildings, Victoria, B.C.

Dear Dr. Tolmie,—I am enclosing two copies of a memorandum on the question of screenings submitted to us, at our request, by the counsel to the Commission.

My colleagues and I are in agreement with the substance of the document, and while giving it consideration we decided to ask the Executive Council, through you, to give us specific instructions as to whether or not we should investigate the effect, if any, that the cash and toll system has on the subject-matters of the inquiry.

The reason we are making this proposal is in view of the instructions given to the solicitor of the City Council of Vancouver. The resolution of the City Council is noted in the memorandum attached.

I regret that I am not in a position to estimate the length of time necessary to complete the investigations covering the point raised, but if the matter is to be proceeded with I would suggest that we first complete the report on the milk problem, on which we have been working for several days. This would mean that a single session would be held at this time on the question of screenings, in order to put the situation fairly before the public. No further hearings would be held until after Christmas, or until such time as the main milk problem had been dealt with satisfactorily.

A special Order in Council instructing us to deal specifically with the "cash and toll" system in effect in Vancouver would seem to be advisable if a long controversy is to be avoided.

I shall be glad to discuss this personally with you in Victoria.

Yours very truly,

(Sgd.) F. M. Clement, *Chairman.*

Prime Minister, Province of British Columbia.

Victoria, October 11th, 1928.

Dean F. M. Clement,
Chairman, Milk Inquiry Commission,
Vancouver, B.C.

Dear Mr. Clement,—I have your favour of the 9th inst. with reference to taking up the matter of screenings further.

I beg to say in reply that I will be glad to submit this to Council at the first opportunity and will advise you.

Yours faithfully,

(Sgd.) S. F. Tolmie.

MILK INQUIRY COMMISSION.

151. MEMORANDUM *RE* ELEVATOR SCREENINGS SUBMITTED BY COUNSEL TO THE COMMISSION.

To the Commissioners:

In order to have clearly in mind what "screenings" are, may I state, in simple form, the following:—

A car of grain upon arrival in Vancouver is sampled by the Grain Inspection Department and graded. The grade of grain, we will assume, is given as No. 1 Northern; in that grain there

is a certain portion which must be removed in order to allow the grain to be put on the market. This portion is called "Dockage," which averages up to about 3 per cent. of the whole bulk in the car.

No. 1 Operation.—The first operation after the weighing, which is done at the top or workhouse of the elevator, is the removal of the dockage by a screening process; this operation, however, allows a quantity of about three-quarters of 1 per cent. to 1 per cent. of the commercial grain to remain in the dockage, which, in order to separate it, necessitates a second operation.

No. 2 Operation.—The dockage is then put through a second screening process. The machine, I understand, is called a Money-maker, and what is left is called "Screenings."

No. 3 Operation.—From these screenings chaff, straw-joints, noxious weeds, dust, and all refuse that is generally found in box cars are removed and that which is left is called "Standard Recleaned Screenings," which material is composed of cracked wheat, a small portion of the smaller whole wheat, buckwheat, pin oats, wild oats, and not more than 3 per cent. of small weed-seeds and chaff. The refuse is of no value commercially.

The screenings question was first brought before the Commission by Mr. J. B. Williams, the City Solicitor for Vancouver, on the allegation that the relevancy thereof was that the Standard Recleaned Ground Screenings, being valuable feed for dairy cattle, would touch the production and the price points of the inquiry, for the reason that if the dairy-farmer could get this commodity at a reasonable price, it would, naturally, cut down his cost of production and might tend, in the last analysis, to affect the price of the milk. I agreed with this contention and so advised the Commission.

After that, all the witnesses who knew anything about screenings were interrogated by me in this regard, and the Commission has, up to date, brought before it several feed merchants, elevator operators, Professor King, of the Department of Animal Husbandry of the University of British Columbia, and two Dominion Government officials in the Seed Branch of the Department of Agriculture, about fifteen in number.

Professor King (starting at page 2762) stated that he had used the Standard Recleaned Screenings for dairy cattle for the last four or five years and he had been able to cheapen the dairy rations by their use. Quotations were made from the Dominion Experimental Farm System Report, published by Mr. George Rothwell, Dominion Husbandman, to the effect that screenings fed at their experimental station had given ton for ton as good results in milk production as standard grain rations (i.e., ground oats, ground barley, bran and shorts), and unqualifiedly recommended them (page 2766).

Mr. Gordon M. Stewart, District Inspector for British Columbia and Alberta in the Dominion Seed Branch, Department of Agriculture, said that it was excellent feed for dairy cattle (page 2936), and that unless it is more profitable to sell them in the raw state somewhere else there should be a large quantity of that kind of feed, if it were separated by the elevators, available on the market (page 2939).

The gist of the evidence of thirty of the dairy-farmers already examined is as follows:—

(*a.*) That a sample produced, which was obtained at Chilliwack and filed as Exhibit 174, was, on the whole, a better article than they were able to obtain in the market:

(*b.*) That if they could obtain screenings of that quality at a reasonable price they would purchase considerable quantities for feeding to dairy cattle; and

(*c.*) That a reasonable price for the superior article would be from approximately $16 to $22 per ton, whereas the price usually charged for the inferior article was from about $25 to $38 per ton.

During the sessions held at Chilliwack and New Westminster, Mr. Williams had interviewed witnesses and had collected a mass of material which he intended to present to the Commission. After consultation with the Commissioners, and with the object of saving time, I applied to the Commission in session for leave to allow Mr. Williams to present the evidence in my stead. I may remark here that the Board had previously ruled that all evidence to be submitted must be primarily presented through me, as the Commission counsel.

On September 18th, 1928, Mr. Williams filed with the Commissioners a certified copy of a resolution passed by the City Council (Exhibit 217), which reads as follows: "*Re* Milk

Inquiry: Recommended that the City Solicitor be authorized to attend at the inquiry in the city's interests and to bring out all available evidence with reference to the matter of screenings. —Wm. McQueen, City Clerk. Seal of the Corporation of the City of Vancouver."

When Mr. Williams opened, he read to the Commission a statement containing alleged facts which he stated he would endeavour to prove. Copy of the statement is as follows:—

"For the benefit of the Commissioners, I might give a slight résumé of what I intend to bring out, so that it will be easier to follow. We will show by oral and documentary evidence:—

"(1.) That screenings are being sold in Vancouver from 200 per cent. to 600 per cent. over the Winnipeg prices.

"(2.) That the terminal elevator tariff now in effect, known as the 'cash' and 'toll' tariff, and

"(3.) Which is really a combination, is an undue and unjust tariff in comparison with the terminal elevators' 'cash' tariff formerly in effect in Vancouver.

"(4.) From screenings alone terminal elevators have made from 200 per cent. to 400 per cent. on capital involved.

"(5.) That the local consumer is being discriminated against on his purchase of screenings, and that he is paying 200 per cent. more than his Washington competitor.

"(6.) That the local consumer is being discriminated against on his domestic grain by the terminal elevator tariffs in effect in Vancouver in comparison with terminal elevators in other Canadian ports.

"(7.) The handling cost of processing screenings submitted is out of all proportion to the actual cost for such processing.

"(8.) The conditions in the grain and screenings situation in Vancouver to-day are on a parity with the conditions which existed in Eastern terminal points, which culminated in a Royal Grain Inquiry, and which were recommended for rectification."

Almost immediately after Mr. Williams had opened the evidence, a flare-up took place on the ground that the evidence went beyond the scope of the inquiry and some of the parties thereupon applied to the Board for leave to consult counsel, and an adjournment was allowed for that purpose. Upon the resumption, further objections were raised, and it was decided that the bringing-out of this evidence should be left to the Commission counsel and that further hearings on the question of screenings should be adjourned until the Commission counsel had completed a perusal and consideration of the data which Mr. Williams agreed to hand over.

Commission counsel has now gone through the material and it appears from it that the intention of Mr. Williams was to introduce evidence to the effect that the cash and toll system at Vancouver, put into effect by the Board of Grain Commissioners, for the payment for screenings to the grower of the grain was detrimental to the grower and affected the price of screenings on this market, and that the cash and toll system was so interwoven with the question of the local price that one could not be proceeded with without the other. This contention has since been confirmed to the Commission counsel by Mr. Williams.

Counsel to the Commission, after considering all the circumstances, is of the opinion that the only questions strictly relevant to the points concerning screenings of interest to the immediate purposes of the Commission inquiring into the milk situation are as follows:—

(*a.*) Are screenings good feed for dairy cattle?
(*b.*) Should not the best quality be obtainable on the local market?
(*c.*) Are screenings available in reasonable quantities to satisfy the demand?
(*d.*) If the best quality be obtainable, would the demand increase?
(*e.*) Should the price be as high as it is?

Out of the evidence there may emanate other pertinent questions.

After a careful consideration of the evidence so far, my present opinion is:—

(*a.*) That a prima facie case has been made out on the part of the dairy-farmer of the Lower Fraser Valley (the area to which the evidence has been confined) upon the following points:—

(1.) That Standard Recleaned Ground Screenings and oat-scalpings (a by-product of the regular elevator run) constitute good feed for dairy cattle.

(2.) That the best quality has not been a constant commodity on the market, taking into consideration periods when no grain is being cleaned.

(3.) No reason has been put forth to show why the best quality is not always available. It would seem that an inference may be drawn from the evidence to the effect that the manufacturer is not very anxious to increase the trade.

(4.) That the dairy-farmers would offer a ready market for large quantities of the best article at a reasonable price.

(5.) That the price is too high when compared with other feedstuffs, such as oat-chop. The farmer would be willing to pay from $16 to $22 per ton, or even a price of approximately one-third per ton less than the current price of oat-chop.

(6.) That a feed known to the dairy-farmer as "screenings" and oat-scalpings is on the market in available quantities, but owing to its inferior quality and high price the demand is not commensurate with other feedstuffs.

(7.) That approximately 90 per cent. of the screenings are shipped annually to the United States.

(*b.*) That the point regarding the cash and toll system, although within the jurisdiction of the Board, is, to my mind, too remote from the main objects of the Milk Inquiry to necessitate investigation by this Board.

I would put it on a parity with the taking of evidence of the conditions surrounding the milk production, price, etc., in Alberta, or any other of the Provinces of Canada, or, as a matter of fact, in any other place, all of which may be very useful information, but the time and expense involved in securing it would hardly be justifiable, unless the Executive Council thought otherwise. Furthermore, I infer that this Board may consider it unethical to probe the matter from the tariff standpoint by reason of the fact that it comes directly within the jurisdiction of the Board of Grain Commissioners, which sits annually in Vancouver, and I understand it has that very point now under consideration.

In conclusion, may I suggest that as only part of the evidence on screenings (leaving out consideration of the tariff matter) has been put in, it would seem proper to defer closing the case until the feedmen and others so interested have had an opportunity of meeting the prima facie case. I estimate that two sessions should complete it.

Respectfuly submitted.

(Sgd.) E. A. Dickie,
Counsel to the Commission.

Dated at Vancouver, B.C., October 9th, 1928.

152. SUMMARY OF PRINCIPLES ON WHICH THE RECOMMENDATIONS ARE BASED.

The following principles are laid down in order to assist the general reader in visualizing the situation and to indicate to him what has guided the Commission in its recommendations:—

(1.) The general recognition that milk and cream for the fluid market is a public utility or a public commodity: (*a*) Because of its place in the diet and consequent wide general use; (*b*) because it is an animal product often consumed raw; (*c*) because of the ease with which it may become contaminated; (*d*) because of its relation to public health; (*e*) and because of many laws, rules, and regulations now governing its production, handling, bottling, delivery, and sale; and, further, that the urban districts shall be assured of a plentiful supply of good quality at a fair price all the time.

(2.) The general recognition that the starting-point in any changes that are to be made is the situation as it exists to-day; that this situation is highly competitive *and that it is desired to retain competition*, but under rules and regulations that are in keeping with the exigencies of the situation.

(3.) The general recognition that these recommendations apply only to milk and cream for the fluid trade and not to ice-cream, butter, condensed milk, cheese, or any other product of the dairy industry, except in so far as these products enter into the problem of "surplus" herein referred to.

(4.) The necessity of legislation to make possible the creation of a Committee of Equalization, herein referred to as the *Committee of Direction;* and, further, that in the matter of any new legislation owing to the complicated nature of the subject-matter, only the broad general principles to be provided for, and no attempt to be made to provide for all the small details involved; these to be left to the discretion of the Committee of Direction, which should be given power to pass regulations to meet each situation as it arises.

(5.) The necessity for an advisory committee to the Committee of Direction, which advisory committee shall consist of representatives of the producers and of the distributers and of the consumers, *any one of which shall have right of appeal direct to the Lieutenant-Governor in Council from any ruling of the Committee of Direction.*

(6.) Provision for the financing of the Committee of Direction and for delegating to it such powers as have been herein recommended or may be hereafter considered advisable.

(7.) The general recognition that the Fraser Valley Milk Producers' Association is not to be discouraged in the wholesale and retail fluid-milk and cream business in Vancouver and adjacent municipalities, and is to be encouraged in its efforts to maintain an increasing milk-supply, to manufacture its surplus into milk products, and to develop and extend its foreign markets.

(8.) The general recognition of the F.V.M.P.A.—the co-operative farmers themselves as represented by their distributing organization—as the standard of measure for comparison between and among distributing companies; that is, to consider the F.V.M.P.A. the basis for efficiency or inefficiency and compare all other distributers to it.

(9.) The general recognition that all distributers now in business have a right to continue in business and to enjoy the same privileges if they accept the same responsibilities neither more nor less than the farmers who are represented by the F.V.M.P.A.

(10.) All independent distributers who buy direct from the country to operate on the same spread, estimated monthly, as that on which the F.V.M.P.A. operates. This spread may vary monthly.

(11.) The price to the consumers, restaurants, and hotels to be fixed according to the fat content and solids not fat contained in the milk; the price to vary according to seasons after the custom in other Canadian cities, advancing with the season of short supply and falling with the season of increasing supply.

(12.) The independent shipper not to be penalized by reason of the fact that the absolute price f.o.b. Vancouver for equal grade and quality is being equalized; but rather that the co-operative shipper be brought up gradually until not later than the end of the third year of the operation of the Committee of Direction all shippers are on an equal basis.

(13.) The price per pound fat paid to the farmer, whether a co-operative or an independent shipper, to be the monthly settling rates of the F.V.M.P.A. for *the basic-fluid quantity* and *the surplus quantity* plus such other amounts as may be available from time to time from the Committee of Direction.

(14.) The guarantee of the supply of all distributers on the basis of their proportionate volume share in the fluid market in 1927.

(15.) Some savings to be made on handling costs by encouraging amalgamation until the number of distributing dairies has been reduced to two or possibly three large companies and a number of producer-vendors.

(16.) The Committee of Direction to take into consideration at once the matter of duplication in deliveries and, where possible, routes to be combined and expenses reduced.

(17.) The competition among the distributers to be on a "service basis" within a milk-fat range at a fixed price rather than on a price-cutting or private price agreement basis.

(18.) Encouragement of the manufacture of milk products for home consumption and for the export trade by directing that each farmer, whether his product be sold on the fluid market or in the lower-priced world markets, shall receive his proportionate share of the advantages of both markets.

(19.) A proportionate share of the fluid market to be open to all producers in the T.B. Free area who can produce the standard quality and whose location will permit of delivery for sale in the fluid market.

(20.) The proportionate share of the fluid market to be open to all outside of the T.B. Free area and whose location will permit of delivery, whose milk is of standard quality, and who can produce a certificate signed by an approved Provincial or Dominion Government official showing that the herd producing the milk has been tested and found to be free from tuberculosis.

(21.) The encouragement of improvement in quality by an amendment to the "Milk Act" reducing the maximum count previous to pasteurization from 1,500,000 to 1,000,000 at the beginning of the second year to 500,000 at the beginning of the third year after the coming into force of any regulations which may pass based on these recommendations.

(22.) The encouragement of more uniform monthly production on the part of the farmer by establishing a basic-fluid quantity based on winter production, which basic-fluid quantity may be carried into the summer at the market price for fluid milk, with the result that each farmer would then be responsible for his own surplus and would receive the surplus price for all production above said basic-fluid quantity.

(23.) The encouragement of potential fluid shippers whose product may at some time of the year or in the future be required for the fluid market, such as the shippers to the products plants, by establishing a basic-fluid quantity for all who can attain and maintain the necessary standards of quality, and by paying for it at the fluid price.

(24.) The continuation of competition among individual farmers by placing the emphasis on: (*a*) Quality production; (*b*) uniform production for the whole-milk market and paying accordingly; (*c*) by changing the emphasis from a price that is higher or lower than a neighbour's price for equal grade and quality to one of uniform price for equal grade and quality; (*d*) by emphasizing lower production costs as a basis of profits in addition to the possibility of prices advancing from time to time.

(25.) The continuation of competition among the breed associations on any basis except the price per pound milk-fat contained in the milk.

(26.) The costs of financing the Committee of Direction to be a direct charge on the industry benefiting by making a direct assessment per pound milk-fat to be collected through the distributing companies.

(27.) The producer-vendors not to be included in the recommendations for equalization at the present time, but all producer-vendors to be licensed at a stated rate per annum per producing cow; said rate to be at the discretion of the Committee of Direction.

(28.) The idea that time, some months and possibly three years, be a factor in bringing all the recommendations into effect, but that a start be made at once by passing the necessary legislation to permit of the organization of the Committee of Direction.

(29.) That all the recommendations are interlocked and that failure to give effect to some one recommendation might readily disrupt the general plan, and consequently any one recommendation should be neglected only after full consideration in relation to the plan as a whole.

(30.) The encouragement and safeguarding of the various interests in such a way: (*a*) That the spirit of progress in the interests of each other and the community will come to prevail in the place of the spirit of mutual frustration that now exists; (*b*) that growth with the community instead of at the expense of the community will come to be recognized in the code of business ethics in the milk business.

RECOMMENDATIONS.

153. THE GENERAL ASPECTS.

(1.) *Pasteurization.*—That health authorities be required to supervise every detail of pasteurization plants and processes, and to permit the use of only such standard equipment and processes as shall be approved by the Provincial Board of Health.

(2.) *Homogenization.*—That the sale of homogenized milk for the fluid market be made illegal, but that provision be made for a product containing not less than 8 per cent. fat nor more than 9 per cent. fat, the whole of which product shall have been homogenized.

(3.) *Cream Regulations.*—That regulations be formulated for the care of cream at dairy-farms and city dairies, and that these in principle be the same as those that obtain in respect of milk.

(4.) *Milk-cans.*—In the evidence given before the Commission the question of the size of the cans now in use for conveying the milk was referred to by numerous witnesses, including producers, dairymen, truck-drivers, and representatives of transportation companies, and while no definite preference was expressed for either the 8- or 10-gallon can, the preponderance of evidence was in favour of uniformity. The Commission therefore recommends that a regulation be put into effect providing that all new cans purchased after the coming into force of these recommendations be of the 10-gallon type, thus allowing the proportion of 8-gallon cans now in use to disappear gradually as they wear out.

(5.) *Provincial Laws and Regulations.*—That all Provincial laws and regulations relating to milk and cream as contained in the:—

(*a.*) "Milk Act," chapter 42, and the regulations thereunder:

(*b.*) "Creameries and Dairies Regulation Act," chapter 58, and the regulations thereunder:

(*c.*) "Contagious Diseases (Animals) Act," chapter 47, and any regulations thereunder:

(*d.*) "Health Act," chapter 102 and any regulations thereunder;

together with any other statutory enactments or regulations dealing with this subject-matter, be co-ordinated and consolidated into one Statute for the convenience of all interested parties.

(6.) *Standardization of Milk-counts in British Columbia.*—That supervision by the Province should be provided for all laboratories doing bacterial counts on milk such as will secure the uniform use of standard methods throughout the Province; that is, supervision similar to that already existing under Dominion and Provincial regulations for securing similar uniformity in cream-grading and testing for milk-fat.

(7.) That the Government of British Columbia, through the proper department, make such provision as is necessary for the checking of records of bacterial counts of milk as it is graded at the receiving-platforms, and also for conducting such bacterial tests as are considered advisable from time to time; and, further, that the necessary laboratory facilities be provided for bacterial tests, so that any shipper may appeal direct to the department from any grading made by the dairy to which he ships his milk; and, further, that these appeal tests shall be made at a charge of not more than 50 cents per sample.

(8.) That as much assistance as possible be given by the Government of the Province of British Columbia to those official bodies, private individuals, and organizations that are encouraging more uniform production of milk of good quality at the lowest possible cost, and especially to the cow-testing associations that are rendering such excellent service at the present time; and also that, as soon as possible, consideration be given to the organization of a more complete and efficient "district representative" system properly officered and directed, in order that the best possible information on production and distribution may be available at all times.

(9.) *Cream from Butter.*—That cream or milk manufactured from whole milk and butter or from skim and butter should be so marked when offered for sale.

(10.) *Bottle Exchange.*—(*a.*) That trafficking in milk-bottles bearing the name or trade-mark of a dairy be declared illegal:

(*b.*) That all dairies that have their names or trade-marks marked on their bottles or cans should have legal protection against the use of their bottles or cans by any other concern:

(*c.*) That it should be made illegal for any milk-bottle or milk-can to be used for any purpose other than as a container for fluid milk or cream:

(*d.*) That in order to facilitate the return of bottles to their rightful owners the dairies would be well advised to establish a bottle exchange.

(11.) *Daylight Delivery.*—That the Committee of Direction take into consideration at once the matter of daylight delivery and be authorized to make such changes in the present delivery times as the conditions and circumstances warrant.

154. SOME LEGAL ASPECTS.

(12.) That Regulation 17 of the "Regulations governing Creameries and Dairies," dated June 2nd, 1925, issued under the provisions of the "Creameries and Dairies Regulation Act," be amended by substituting for the fee of $5 mentioned in the tenth line of said regulation a fee of $1.

(13.) That subsection (2) of section 3 of the "Milk Act" be amended by adding after the word "surgery," in the second line thereof, the following: "and shall have had experience and training in milk production subject to rules and regulations to be laid down by the Provincial Dairy Commissioner."

(14.) That section 5 of the "Milk Act" be amended by the addition of the following: "and no inspection shall be complete until the Inspector has been present at, and reported on, the methods employed during the milking of the cattle."

(15, 16, and 17.) That subsections (2), (3), and (4) of section 7 of the "Milk Act," chapter 42, which deal with the "grading of dairy-farms," be amended by providing that before the dairy-farmer may supply milk for human consumption, without previous pasteurization thereof,

or after previous pasteurization thereof, as the case may be, he must, subsequent to obtaining the certificate now prescribed from the Provincial Inspector, obtain a permit to so supply milk obtained from that dairy-farm, from the Medical Health Officer of the municipality to which the milk is shipped or supplied: such Medical Health Officer in granting or refusing such permit to be governed by the questions of safety and quality only.

(18.) That section 8 of the "Milk Act" be amended by the addition of: "and the Inspector shall notify the Medical Health Officer of the district supplied, and the distributer, of his action in the matter."

(19.) That subsection (1) of section 9 of the "Milk Act" be amended by adding after the words "any Provincial Inspector," in the seventh line thereof, the words "and the Medical Health Officer of the municipality supplied."

(20.) That subsection (1) of section 10 of the "Milk Act" be amended by making these regulations apply to producers as well as vendors and carriers.

(21.) That clause (*c*) of subsection (1) of section 10 of the "Milk Act" be amended by adding the word "machinery" after the word "all"; to read "all machinery, utensils, and vehicles," etc.

(22.) That clause (*d*) of subsection (1) of section 10 of the "Milk Act" be amended by changing the word "licences" to the word "permits."

(23.) That clause (*i*) of subsection (1) of section 10 of the "Milk Act" be deleted in view of the amendment recommended in respect of subsections (2), (3), and (4) of section 7 of the Act.

(24.) That clause (*b*) of subsection (1) of section 12 of the "Milk Act" be amended by substituting for the words "found in a vehicle," in the second line thereof, the words "wherever found."

(25.) That subsection (1) of section 17 be amended by substituting for the words "one hundred and forty-five" (in the third line of this section) the words "one hundred and forty-two"; and by adding after "Fahrenheit" (in the same line) the words "or more than one hundred and forty-five degrees Fahrenheit"; and that for the word "fifty" (in the fourth line) be substituted the word "forty-five."

(26.) That Regulation 3 of the Regulations under the "Milk Act," approved April 4th, 1928, be amended by the elimination of the class of milk referred to as "Raw Milk and Raw Cream."

(27.) That Regulation 3 of the Regulations under the "Milk Act," approved April 4th, 1928, wherein said regulation deals with "Pasteurized Milk and Pasteurized Cream," be amended by providing that: During the first year after the coming into force of this proposed amendment the bacterial count of milk at any time prior to its pasteurization shall not exceed 1,500,000 per cubic centimetre; during the second year after the coming into force of this proposed amendment the bacterial count of milk at any time prior to its pasteurization shall not exceed 1,000 000 per cubic centimetre; and during the third and any subsequent year after the coming into force of this proposed amendment the bacterial count of milk at any time prior to its pasteurization shall not exceed 500,000 per cubic centimetre.

(28A.) That in addition to the regulations now prescribed with reference to the production and sale of the class designated as "Preferred Raw Milk and Preferred Raw Cream," medical inspection once a month of all persons handling the milk be required.

155. THE ECONOMIC ASPECTS.

(28.) That the recommendations as made be applied primarily to milk and cream for the fluid trade and not directly to ice-cream, condensed milk, powdered milk, butter, cheese, or any other produce of milk and cream, except in so far as these products enter into the problem of surplus as herein referred to.

(29.) That the production, distribution, and sale of milk and cream for the fluid trade be treated as a public utility, to be closely regulated and safeguarded in the interests of the public as a whole.

(30.) That, although the time is not ready for the organization of municipal distributing systems, nor the organization of municipal receiving and grading stations, nor the municipal ownership and operation of any part of the production and distributing systems, nevertheless,

the municipal governments, the Dominion Government, and the Provincial Government, each in its place, should exercise increasing authority as an impartial referee in the interests of the producer, the distributer, and the consumer in the matter of a public utility such as the fluid milk and cream industry.

(31.) That efficiency in production and distribution be recognized as best encouraged by regulated competition.

(32.) That the necessary legislation be enacted forthwith making possible the appointment of a Committee of Direction whose duty it shall be to make and to enforce by all necessary and sufficient means, rules, and regulations with regard to the production, distribution, and sale of fluid milk and cream within the area herein defined as the T.B. Free area and competing districts.

(33.) That the Committee of Direction shall consist of one man, appointed by the Lieutenant-Governor in Council, who shall also be chairman of the advisory committee hereinafter mentioned. He shall be appointed without term and be subject to dismissal on the ground of incompetence only; said committee to be given power to nominate its own associates and assistants to be appointed by the Lieutenant-Governor in Council; also to have authority to employ such health, legal, and economic advisers as may be required.

(34.) That the powers, duties, and functions of the Committee of Direction shall be in principle the same as those laid down in the proposed Bill entitled "An Act for the Relief of Dairy-farmers," but as modified and strengthened by the recommendations of this Commission.

(35.) That provision be made for the appointment of an advisory committee to the Committee of Direction, which advisory committee shall consist of representatives of co-operative dairy-farmers, independent dairy-farmers, co-operative distributers and independent distributers, raw-milk producer-vendors, representatives of consumers and others, but not more than a total of nine in number.

(36.) That the advisory committee shall meet at least monthly and at such other times as called by the chairman to discuss and advise on all matters pertaining to the milk business; that this committee shall serve without pay, and that the committee as a whole or any individual representative or group within the committee shall have right of appeal direct to the Lieutenant-Governor in Council from any ruling of the Committee of Direction.

(37.) That the Committee of Direction shall be financed by a direct levy at a rate per pound milk-fat, to be determined by said committee, on all milk-fat entering into trade in the area described, other than that portion of the milk-fat which may be exempted from time to time by the Committee of Direction as herein provided.

(38.) That for the first year of the operation of the Committee of Direction the levy for the purpose of financing the committee be made on the total number of pounds milk-fat delivered to the various plants of the Fraser Valley Milk Producers' Association or directed by the association to be delivered elsewhere; and on all fat delivered to, handled by, or in any other way directed or controlled by independent distributers in Vancouver, New Westminster, and adjoining municipalities, but not east of the City of New Westminster.

(39.) That individual producer-vendors of fluid milk and cream be exempted from the levy per pound milk-fat, but all such producer-vendors, including individual cow-owners who sell some milk or cream, be licensed each year at the rate of $1 for each cow owned or controlled by them and which has produced or may produce some milk during the current year.

(40.) That the Committee of Direction shall have power after the first year of operation to increase the licence fee of producer-vendors and of any others who have been exempted from the per pound milk-fat levy, should such a procedure in the opinion of the committee be considered necessary.

(41.) That the licence fee collected from producer-vendors shall be applied toward the expenses of the Committee of Direction and shall not entitle the producer-vendors or others paying this licence to participate in any equalization adjustment.

(42.) That for the first year of the operation of the Committee of Direction the measure of equalization shall be 50 per cent. of the amount as stated in the proposed Bill, "An Act for the Relief of Dairy-farmers," and that this percentage shall increase progressively until by the beginning of the fourth year of the operation of the Committee of Direction full equalization shall have taken place.

(43.) That in granting the measure of relief indicated an endeavour be made to bring the prices per pound milk-fat paid to the Fraser Valley Milk Producers' Association shippers up to the prices paid to the independent shippers.

(44.) That, in addition to the general powers and duties recommended, it shall specifically be within the powers and also shall be the duty of the Committee of Direction to require any dairy-farmer to pay to it (the Committee of Direction), or to require from the dairy-farmer upon the person, firm, corporation, or association to or through whom his milk or surplus products are being sold or disposed of, an order by which the Committee of Direction may collect, such amounts as may be determined by it, but not at any time more than 7 cents a pound milk-fat (which amount is at the present time the usual bonus rate paid to the independent shippers, made possible by the fact that their distributers handle but a small proportion of the surplus milk).

(45.) That after the third year of the operation of the Committee of Direction all payments to independent producers and to co-operative producers alike shall not only be equal per pound fat for equal grade and quality on the basis of the principle laid down for "basic quantities" and "surplus quantities," but that all "bonus" payments to producers, including such payments as the advance price to independent shippers and the deferred payment of the F.V.M.P.A., shall become in total an equalization fund to be paid to all shippers on the basis of their total milk-fat production; that is, each producer to receive the same bonus rate per pound milk-fat on each pound of milk-fat sold or disposed of under the scheme of equalization.

(46.) That the independent distributer be required to contribute to the Committee of Direction such amounts, calculated monthly, as are his proportionate contribution based on the percentage of his milk that is sold in the fluid market as compared to the percentage of his milk that is sold in products markets; always using the Fraser Valley Milk Producers' Association's proportions of the various markets and the Fraser Valley Milk Producers' Association's settling rates as the basis from which to calculate. (*See* paragraph 126.)

(47.) That all prices per pound milk-fat shall be calculated on the basis of f.o.b. Vancouver.

(48.) That the co-operative producers themselves, as represented by the Fraser Valley Milk Producers' Association, be not discouraged in their efforts to direct their sales in the various markets.

(49.) That for the purposes of these recommendations the books of the Fraser Valley Milk Producers' Association be used in calculating the necessary data by which all other distributers shall be governed; that is, that the proportion of the production that goes into the fluid market as compared to the proportion of the production that goes into the products markets be regarded as the proportions for the whole area, and that the pool price received for each class-fluid *versus* product—become the basic prices from which all calculations for purposes of equalization are made.

(50.) That the prices of milk and cream bottled to the consumers, bottled and loose to hotels, restaurants, and others be fixed on the basis of the milk-fat content by the Committee of Direction, and that these prices in turn be based on a standard pasteurized milk having a milk-fat range of from 3.25 per cent. to 3.6 per cent., which milk shall be sold at not less than and not more than a fixed number of quarts per dollar. For the first year the Commission recommends the prices suggested in paragraph 135 as the basis from which to calculate.

(51.) That the price to consumers be not set at any higher average than the average of other Canadian cities of somewhat similar size and importance, and that such price shall vary with the seasons.

(52.) That the independent distributer be required on the basis of (*a*) an equalized price to the farmer, (*b*) an equalized price to the consumer, to operate on the same monthly spread as the Fraser Valley Milk Producers' Association.

(53.) That all distributers shall be guaranteed from such source or sources as may be designated by the Committee of Direction their supply of milk at prevailing market prices up to their proportionate volume share of the total fluid-milk trade enjoyed in the year 1927.

(54.) That no discouragements be placed in the way of the present distributing companies that wish to amalgamate.

(55.) That in any amalgamation that may take place a merger on the basis of the source of the milk-supply must be preferred to indiscriminate amalgamation that may seriously disrupt the channels of trade and lead to the disuse of dairies or products plants that are now modern

and efficient; and in the event of such an amalgamation being consummated, adequate protection shall be afforded those now engaged in the industry who are properly equipped to handle the business efficiently and in accordance with the regulations.

(56.) That a basic-fluid quantity be established annually for each farmer-shipper, and that this basic-fluid quantity be that part of his production of the six winter months which is his proportionate share of the fluid market for that period, and that this basic-fluid quantity be carried into the six summer months; and that the basic-fluid quantity be paid for at the market price of fluid milk.

(57.) That that part of each farmer's production over and above his basic-fluid quantity be considered surplus and be paid for both winter and summer at the surplus price (which is really the pooled products price).

(58.) That the Fraser Valley Milk Producers' Association settling rate for fluid milk and likewise for surplus milk each month be considered the basic prices for the month, and consequently be the prices that all other distributers shall pay to the shippers.

(59.) That all dairy-farmers who meet the requirements of both the health and the equalization regulations shall be granted permits free of charge to sell in the fluid market.

(60.) That all dairy-farmers who are granted permits to sell in the fluid market shall share in the basic price for their proportionate basic quantity of fluid milk, whether that quantity is sold in the fluid market or not.

(61.) That the Committee of Direction be directed to take into consideration immediately the matter of duplication of deliveries in distribution, with the idea of making such adjustments as will decrease the number of duplications in delivery routes and reduce such delivery costs to as great a degree as may be possible without disrupting routes controlled by present interests.

(62.) That all exhibits, a copy of the evidence, and such other data as are now in the hands of this Commission be made available to the Committee of Direction, except such papers as were loaned and must be returned to the owners; and, further, that all papers and documents given in confidence be held in confidence, being used for the guidance of the Committee of Direction only.

(63.) That it shall be specifically within the powers of the Committee of Direction to grant licences to companies, associations, individuals, or others in the milk and cream distributing business, which licence shall be a permit to carry on business under the terms and conditions therein referred to, and which licence shall be a condition precedent to the right to engage in this business; that it shall also be within the power of the Committee of Direction to cancel any licence granted by the committee, and from this cancellation the licensee shall have no appeal except direct to the Lieutenant-Governor in Council.

F. M. CLEMENT.
H. W. HILL.
G. E. HANCOX.

VICTORIA, B.C.:
Printed by CHARLES F. BANFIELD, Printer to the King's Most Excellent Majesty.
1929.

1,325-729-6696